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ABSTRACT

The goals of this dissertation are to provide an empirical examination of the impact of competing technologies on cable television firms and to document existing pricing behavior in the cable and pay programming industry. The introduction provides a brief overview of the cable television industry, including the impact of cable on federal policy goals and of federal regulations on cable operators. Chapter 2 summarizes the present structure of cable television regulation by discussing franchise fees, rate regulation, ownership restrictions, regulatory parity, franchise renewal, and mandated lease access. Federal policy goals and how they are impacted by the economic structure of the video industry are documented in Chapter 3. Chapter 4 discusses the evolving price structure in the cable industry and its implications for federal policy goals. Chapter 5 provides an empirical examination of the impact of competing technologies on the cable television industry, and Chapter 6 presents conclusions and policy implications. Appendices contain an explanation of the modelling approaches utilized in the text and six data tables; a bibliography is included. (JB)

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CABLE TELEVISION, MARKET POWER AND REGULATION

Kenneth E. Thorpe

June 1985

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CABLE TELEVISION, MARKET POWER AND REGULATION

Kenneth E. Thorpe

June 1985

The original version of this study was prepared as a dissertation in partial fulfillment of the requirements of the doctoral degree in policy analysis at The Rand Graduate Institute. The faculty committee that supervised and approved the dissertation consisted of Charles Phelps (Chairman), James Dertouzos, and Willard Manning.

SUMMARY

The appropriate level of government involvement in the cable television industry has been actively debated for nearly 30 years. Over this time period, the "need" to regulate the rates cable operators charge subscribers, and programmers, as well as the extent to which cable operators should control what consumers view over cable has been actively debated. The most recent attempt at defining the appropriate role of government has recently culminated in new federal legislation whose major thrust is to reduce further government intervention in the industry.

Much of the recent and continuing policy debate concerning cable television has focused on the impact of cable franchising agreements--which may create market power for cable operators--and stated federal communication policy goals. In short, the federal government has consistently stated its intention of promoting cable policies which increase diversity in both the source and type of television programming, encouraging access to the medium, while at the same time promoting efficient cable markets.

The goal of this dissertation is to provide policy-relevant information that may be used in the continuing public debate regarding the "appropriate" government role in the rapidly expanding telecommunications industry. Specifically, the dissertation will argue strongly that the past and current cable policy debate has overlooked some important points. In particular, much of regulatory debate over the need to regulate cable operators has, incorrectly I believe, been driven by the assumption that the regulated commodity--the distribution of television programming--is a private good. Based on this assumption, cable regulators have often pointed to the need to redress the problems, and assumed welfare losses, generated by monopolistic cable pricing. Yet, television broadcasting is a public, and not a private good. Further, simply devising a method to exclude viewers through the introduction of pay cable television does not alter the underlying public good nature of cable broadcasting. Moreover, the appropriate

public policy intervention may depend crucially on this public/private good distinction.

Much of the policy debate over the "need" to correct monopolistic welfare distortions has also overlooked the actual pricing behavior in the industry. Cable operators, for example, rarely set monopoly prices for each channel of programming. Instead, cable operators routinely price discriminate, which in many cases may lead to conditions closely approximating an efficient allocation of the number and mix of pay television programming. Since much of the debate has assumed that cable operators set monopoly prices for each program, policymakers may not have used a relevant benchmark to analyze the impact of proposed policy changes from the status quo.

Finally, policymakers have not recognized the policy implications resulting from the sunk cost nature of investment made by cable operators. Indeed, given the specialized capital investments incurred by cable operators, long-term relationships (contracts or regulation) between cable firms and the government will always exist. Thus, focusing on the dynamic aspects of contracts and efficiency--rather than notions of static inefficiencies--remains important.

The second major goal of the dissertation is to provide information regarding the extent and implications of market power in the cable television industry. In particular, much of the policy discussion has speculated about the impact of new video competition on the market power of cable operators. In addition, the empirical section also evaluates the effectiveness of current state and local regulations--primarily rate regulation.

The findings emerging from the empirical section are unique, and I believe quite interesting. The three most notable results are that current state and local regulation of basic cable prices do not affect appreciably the price-cost margins of cable operators. This result is not especially surprising given the ability of cable operators to alter prices they charge for programming that is not regulated.

Competition from other sources of video programming--most notably subscription television--does have a competitive impact on the market power of cable firms. In areas where STV was available before cable, cable price-cost margins were nearly 10 percent lower than in other

markets. Where STV was available after cable television, however, there was a negligible impact on cable price-cost margins. These results highlight the importance of being the "pioneering" video technology. This is especially important for competitors to cable firms--who all have larger channel capacities--since they have generally not been able to provide programming which differs from that offered over cable.

Although the finding that competition from a "pioneering" video competitor to cable may reduce cable price-cost margins is interesting, it may not be a useful guide for public policy. Indeed, many areas of the country already have cable available. Hence, new competitive, multichannel technologies such as multichannel MDS, and direct broadcast systems will usually face competition from an entrenched cable operator with larger channel capacity, and more pricing and program selection flexibility. Thus, unless these new technologies are able to differentiate their program offerings from cable, the competitive role of these outlets may be limited.

ACKNOWLEGMENTS

By its very nature, a dissertation represents the joint efforts of a number of individuals. Most notably, I would like to thank my parents, Gerald L. and Connie M. Thorpe for their constant enthusiasm, support and persuasion to finish this dissertation. I would also like to thank--although not implicate--Charles E. Phelps, James N. Dertouzos, and Willard G. Manning, Jr. who served on my dissertation committee. Their insights, expertise and interest were greatly appreciated. The interaction with my committee has produced a dissertation that is clearly more polished. Perhaps more important, however, is that during my short stay at The Rand Graduate Institute I was fortunate enough to cultivate a friendship and sense of collegiality that will last a long time.

Finally, I would like to thank Helen Barnes who handled the preparation of the dissertation with patience and skill. Debts to others, however, do not absolve the author of responsibility for any remaining errors.

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I. INTRODUCTION

The pay television industry has grown dramatically, in both total subscribers and video outlets, over the past ten years. Indeed, an alphabet soup of new video sources has evolved, including cable television, subscription television (STV), multipoint distribution service (MDS), direct broadcast satellites (DBS), videocassette recorders (VCRs), subscription master antenna television (SMATV), and low-power television. A notable feature of this video explosion has been the growth of the dominant pay video technology, cable television, which grew from under 2 million subscribers in 1975 to over 31 million by 1984 (see Table 1.1). Although the number of non-cable competitors to cable has increased, their growth patterns have been uneven. For

Table 1.1

VIDEO SUBSCRIBERS BY SOURCE*
(IN MILLIONS)

End of Year	Cable	STV	VCR**	MDS
1975	1.98	0		0
1976	4.37	0		.04
1977	6.48	.02		.07
1978	9.40	.14		.15
1979	13.87	.40	.50	.28
1980	18.07	.79	.80	.45
1981	22.53	1.54	1.40	.53
1982	27.20	1.82	2.00	.57
1983	31.40	1.20	4.10	.49

Source: *Kagan Census of Cable and Pay TV*, December 31, 1984.

* DBS was not available until 1983, historical data on SMATV were also not available.

** VCR recorders, from Knowledge Industry Publications, Inc., Electronic Industries Association.

example, videocassette recorder sales continue to expand, rising from one-half million in 1979 to over 4 million by 1983. While STV and MDS enjoyed strong initial growth in popularity, subscriber totals decreased sharply in 1983.

The high fixed cost nature of providing cable service has motivated a wealth of recent research focused on whether cable operators are natural monopolists.[1] Empirical studies of cable technology tend to support the natural monopoly hypothesis.[2] The technological characteristics of cable television have raised a number of important public policy issues. Most notable among these issues is the fear that cable operators--through exercising market power derived from its natural monopoly--could thwart federal policy goals promoting program and source diversity, access and economic efficiency.[3] Consider, for example, the position taken by the National League of Cities:

> Cable's *de facto* monopoly position in each community results in each cable operator having monopoly control over the conduit into the houses and businesses served by the operator's system.
> Competition between two cable systems in the same geographic area is nonexistent. Although consumers and businesses may obtain some of the system's services from other sources, none of these alternative communications service providers can offer the variety of communication services offered by cable. Consequently, local governments protect their citizens by including provisions in the franchise agreement with the cable operators allowing local government to set or regulate rates for basic cable services, to insure access, and to set minimum service standards.[4]

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[1] Strictly, for a multiproduct firm like cable television, two conditions must be met before a firm can be considered naturally monopolistic. First, cost conditions must result in economies of scale in the production of each good, and second, the firm must exhibit economies of scope. See Sharkey (1982).

[2] Owen and Greenhalgh (1982), Noam (1982).

[3] Of course, the nature of the relationship between market structure and economic performance has been under serious debate for many years. Natural monopolists, for example, may or may not have market power. For a good discussion of both the necessary and sufficient conditions required for natural monopolists to exhibit market power, see Baumol, Panzar and Willig (1982).

[4] National League of Cities (1981), especially the summary.

Others disagree with this assessment, however. Indeed, those favoring a more relaxed regulatory atmosphere note the recent explosion in new video competitors to cable.[5] Actual or potential competition from non-cable sources of video programming, it is argued, limits both the market power of cable operators and its ability to thwart federal policy goals.[6] The position expressed in a report commissioned by the National Cable Television Association is to the point:

> ....the primary indicator of market power is the ability of a firm to raise or lower prices without substantially affecting demand for a firm's services. Since most, if not all, video and information services are available from their "vendors" through alternative distribution outlets, a cable operator would appear to lack this pricing power. Even in markets where over-the-air television reception is poor or non-existent, cable systems which raise their rates invite competition from television translators, low-power television, and eventually DBS.[7]

One of the more notable aspects of the debate over the impact of cable on federal policy goals is the lack of empirical information. Although the recent proliferation of new video technologies has been widely heralded and discussed, little is presently known regarding their competitive influence on the cable television industry. Indeed, to date, there have been no empirical studies documenting this impact.[8] One goal of this dissertation, then, is to provide empirical information regarding the impact of non-cable distribution sources on the market power of cable operators.

---

[5] See, for example, Shooshan, Jackson and Kahn (1982), and Gordon, Levy and Preece (1981).

[6] The impact of potential competition on a firm's market power is discussed in depth in Baumol, Panzar and Willig (1982).

[7] Shooshan, Jackson and Kahn (1982), p. 7.

[8] Studies examining the competitiveness of the pay video industry have been very qualitative, often simply listing the potential competitors to cable. Further, the best known quantitative studies simply examined penetration by subscription television in two cabled areas. See Pottle and Bortz (1982).

Cable Operators, Market Power and Regulation

The public policy debate over how to regulate cable operators has focused largely on the question of market power.[9] Market power has been viewed as an impediment to the stated policy goals of both the Federal Communications Commission (FCC) and Congress. These goals, which are derived from the First Amendment, the Communications Act of 1934 and relevant court decisions, are discussed below.

1. *Promote diversity of message sources.* The FCC, in a number of statements, continues to express its interest in increasing the diversity of program types and sources. This interest in promoting competition among message sources has prompted regulations banning certain cross-ownership patterns. Further, many in Congress have again raised interest in constraining market power in the industry through the introduction of mandated leased access.[10] Under this regulatory regime, cable operators would have to provide access to broadcast time on a first come, first served basis for all or a portion of their total channel capacity. The fee charged by the cable operator, the so-called "access fee," would have to be the same fee for all programmers.

2. *Access.* Closely related to the concept of program and source diversity is that of assuring access to the media. Access to the media is simultaneously determined by the number of different media owners and the prices they charge programmers. Access to the media can be reduced if cable operators, through monopoly pricing, reduce the range or number of programs offered. There is the further fear

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[9] One useful definition of market power is that provided by Alchian and Allen (1977). They note that firms with market power are... seller(s) whose selling price will be significantly affected by the amount he offers. He has power to affect his market price. But what is that power?....he must do some searching to ascertain what price and quantity (and what quality of the good?) are most profitable. He has a larger range of possible prices than the price-taker.

[10] An interesting general discussion of these "goals" appears in Owen (1974). This leased access proposal has surfaced on a number of occasions in various Congressional bills. The present attempt in the House, H.R. 4103, contains leased access provisions.

that cable operators could selectively discriminate against certain types of programmers (i.e., those who do not have financial interests).

3. *Allocative Efficiency.* The absence of competition may result in higher prices to cable subscribers and potential programmers, lower quality programming, or both. Concern over the efficiency question has traditionally resulted in the regulation of rates by either state or local governments.

Plan of the Paper

The goals of the dissertation are two-fold. The first is to provide an empirical examination of the impact of competing technologies on cable television firms. This should provide input into the ongoing policy debate over the future of cable television regulation. The second goal is to document existing pricing behavior in the cable and pay programming industry. The actual pricing behavior of video firms has not received much attention. Such an examination is crucial for understanding the market power question and its implications for the performance of the industry. To facilitate these goals, Chapter 2 will provide a brief overview of the present structure of cable television regulation. Chapter 3 will document federal policy goals and how they are impacted by the economic structure of the video industry. Chapter 4 will document the evolving pricing structure in the cable industry and its implication for federal policy goals. Finally, Chapter 5 will provide an empirical examination of the impact of competing technologies on the cable television industry.

II. CURRENT ELEMENTS OF THE CABLE TELEVISION DEBATE

In general, the recent policy debate has focused on the following aspects of existing regulatory policy: franchise fee levels, rate regulation, ownership restrictions, regulation of competing technologies, franchise renewal expectations, and mandated leased access.

FRANCHISE FEES

Almost all cable television franchises are granted through a competitive bidding process which results in exclusive franchising rights for up to 15 years. In return for the exclusive franchise rights, cable operators are required to pay fees ranging from three to five percent of their gross yearly revenues. In addition to the yearly franchise fees, a number of local cable authorities have attempted to extract additional, lump sum payments from the winning bidder. Current legislation (S.66) has attempted to limit total transfers to five percent of yearly gross revenues.

RATE REGULATION

While many municipal and some state governments regulate the rates cable operators charge for "basic" service, the FCC has preempted their authority to regulate "pay" television tiers.[1] Rate regulation is defended by its proponents on two grounds: first, it protects local citizens from monopoly pricing and second, it can be used as leverage by governments over cable firms when negotiating new contracts. Current legislation--S. 66, for example--has specified that the regulation of

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[1] The exact definition of basic and pay cable is somewhat arbitrary. In general, basic cable service refers to providing local television stations, public, educational and government access stations. In contrast, "pay" cable generally refers to programming--usually received by satellite--sold by the cable operator as a separate package. The FCC's authority in restricting the regulation of so-called "pay" cable is outlined in *Clarification of Cable Television Rules*, 46 FCC 2d 175, 186 (1974) and *Brookhaven Cable TV, Inc. v. Kelly*, 573 F. 2d 765 (2d Cir. 1978), *cert. denied* 441 U.S. 904 (1979).

basic cable rates could occur only in areas served by fewer than four over-the-air broadcast signals with the Grade B television contour.[2]

OWNERSHIP RESTRICTIONS

Certain firms often thought as providing a competitive check on cable are precluded from owning or operating cable systems. The most notable ownership bans restrict the broadcast networks, local television broadcasters, and telephone companies from local cross-ownership of cable television systems.[3]

Cross-ownership restrictions were imposed, in part, to reduce market power generated through merger. Cross-owned television/cable firms could, through merger, reduce competition over local spot advertising. Further, by reducing the number of local media gatekeepers by one, other forms of access to the media could be restricted. The price of access, however, (e.g., for advertising, or public access channels) may or may not increase depending on both the extent of possible joint economies of sales and the degree of increased market power.

Network/cable cross-ownerships have been opposed due to the potentially deleterious impact on program diversity. Some have suggested that vertical integration by television networks and cable could result in anticompetitive practices.[4] Here the concern is that the vertically integrated firm could, by excluding competing programmers, increase profits and reduce competition among competing message sources.

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[2] See Senate Bill 66. The Grade B contour, as defined by the FCC, simply provides information on the quality of television signals received by potential viewers.

[3] For a good summary of these restrictions, see Gordon, Levy, Preece (1981), or Network Inquiry Special Staff (1980), Vol. 1.

[4] These arguments are analytically similar to concerns some have had with expanded network ownership of local broadcast stations. Indeed, recent proposed relaxation of television ownership rules by the FCC (i.e., the so-called "12-12-12" rule) has created considerable opposition in Congress. On the other hand, many observers have noted that monopolists may actually increase program diversity. For more on these discussions, see Beebe (1977), Ordover and Willig (1981), and for an application of the arguments to network owned and operated stations, Wildman (1978).

Finally, telephone companies may not operate cable systems in their service areas.[5] Initial concern over such combinations focused on the ability of telephone companies, through cross subsidies, to have a competitive advantage in franchise bidding.[6] This trend would eliminate any competition the phone company might face for wired access to households. Recent changes in fiber optic technology have blurred the distinction between cable and telephone services. Hence, cross-ownership would eliminate an important source of potential competition. Indeed, a number of cable companies have recently started to provide data transfer and other institutional services traditionally offered by the phone company. Further, in some areas, recent attempts have been made to use cable for completing long distance telephone calls, thereby completely bypassing the local telephone loop.

REGULATORY PARITY

Recent technological advances have produced a number of different technologies capable of offering video programming. In addition to cable television, multipoint distribution service (MDS), direct broadcast satellites (DBS), subscription master antenna (SMATV), subscription television (STV), over-the-air broadcasting and low power television stations provide video programming. Existing regulation of these video media are very different, however. The regulation of STV, for example, is based on the regulatory model applied to advertiser supported television. In contrast, MDS is regulated as a common carrier whereas existing regulation of cable television often combines elements of both these models. Different regulatory treatments affect the relative entry and operating costs of these video technologies (see Table 2.1).

---

[5] C.F.R. 64.601(a) 1978. This rule is relaxed by a waiver process if it is uneconomical to provide cable service in low house density areas. Where fewer than 30 potential subscribers per route mile exist, the local telephone company may own the system. *Report and Order*, FCC 79-755, November 19, 1979.

[6] Gordon, Levy, Preece (1981).

Table 2.1

REGULATION ACROSS COMPETING VIDEO TECHNOLOGIES

Regulatory Area	Over-the-air broadcasting	Cable TV	MDS	STV	SMATV
License required (local)	yes	yes (local)	yes	yes	yes
Ownership restriction:					
Limit on "chaining"?	yes	no	no	yes	no
Cross-ownership restrictions	yes	yes	yes	yes	no
Rate regulation	no	yes	yes	no	no*
Content regulation	yes	yes	no	no	no
Franchise fees	no	yes	no	no	no*

*Currently under examination.

Source: FCC Network Inquiry (1981).

Cable operators, for example, must initially receive a franchise license and pay franchise fees, and may be subject to rate regulation. On the other hand, STV operators must apply to the FCC in order to provide programming, but do not face franchise fees or rate regulation. They are, however, subject to cross-ownership restrictions. MDS firms face cross-ownership restrictions, but are not subject to rate regulation. Over-the-air broadcasters must also receive a license from the FCC, face content regulation and cross-ownership restrictions. Their advertising rates, however, are not regulated, nor do they pay franchise fees. Finally, SMATV firms have, compared to other technologies, relatively few regulatory restrictions. Some cities impose franchise restrictions on SMATV firms similar to those imposed on cable operators, others do not.[7] In response to these differences in regulatory treatment, the FCC has been petitioned by SMATV firms in order to get a ruling on whether existing regulations preempt state and local regulation of SMATV.

[7] Both New Jersey and the city of Indianapolis have decided to regulate SMATV firms. In Indianapolis, SMATV firms will have to be granted franchise approval before providing service. In New Jersey, a state court ruled that the state's cable statute also covers SMATV system. See *Multichannel News*, August 29, 1983, p. 1.

The cable television industry has been especially vocal in their opposition to these differences in regulatory treatment.[8] As noted in a recent policy paper:

> All we seek is the right to compete on a level playing field, unburdened by requirements imposed by local governments which place us at a competitive disadvantage by imposing costs on our subscribers...[9]

Further it is:

> ...unfair that cable's competitors don't pay franchise fees, they don't have to give away their service, they don't have to underwrite various local ventures from production studios to police firing ranges, they don't have to go to a regulatory body to seek permission to adjust rates or services and they don't have to expose their business to local political hijinks when their license is up.[10]

FRANCHISE RENEWAL

Existing FCC guidelines specify that the length of a cable franchise, or its renewal, shall not exceed 15 years. Beyond this federal standard, most local regulatory authorities have discretion for renewing a franchise. The recent cable bills passed in the Senate (S.66) and House (HR.4103) provide additional guidance to local regulators on franchise renewal. For example, S.66 prohibits consideration of competing bids before a final decision on renewing the incumbent license is reached. Further, renewal could not be denied unless the cable operator failed to comply with the applicable law. Hence, these provisions provide the cable operator a reasonable expectation of renewal.

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[8] See *National League of Cities* (1981).
[9] *Broadcasting*, February 21, p. 32.
[10] *Ibid.*

MANDATED LEASED ACCESS

The growth in the number of channels controlled by cable operators has renewed interest in mandating access to cable. Depending on the structure of the access requirements, cable rates and the number of channels programmed may either increase or decrease. The ultimate effect of access regulation on the number of channels programmed and on cable rates depends on the proportion of channels left under the control of the cable operator, whether access rates are regulated or controlled by the cable operator, and whether the programs are substitutes or complements to each other.[11]

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[11] Besen and Johnson (1982).

III. STATED FEDERAL POLICY GOALS AND THE ROLE OF MARKET STRUCTURE IN THE CABLE TELEVISION INDUSTRY

INTRODUCTION

This chapter will provide a brief discussion of the stated goals of the FCC and Congress in the video marketplace.[1] Briefly, these goals deal with the diversity of programming (both the types and sources), access to the media and economic efficiency. The evolving structure of the cable television industry is commonly perceived as affecting the attainment of these goals. To some, there are fears that cable operators, by exercising market power, could restrict the number of channels programmed, discriminate against competing message sources, charge high prices, restrict the number of subscribers served, and reduce the diversity of programming. Others disagree with this conclusion, however, instead citing the growth in competing sources of pay television programming. The growth in competition, it is argued, precludes the ability of cable operators to behave in this manner.

STATED GOALS OF FEDERAL COMMUNICATIONS POLICY

Three goals have consistently been noted by the FCC and Congress in guiding regulation of the cable television industry: diversity in program sources and types, access to the media, and economic efficiency.

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[1] The emphasis on stated versus actual goals is quite intentional. Indeed, a number of authors have noted that the actual goals of policy-makers are directed toward maximizing some objective function--say votes in a district. This goal is achieved through public policy choices which redistribute income. As a result, actual policy outcomes under this regime may or may not coincide with stated policy goals. Indeed, in the context of the video industry, there have been a number of occasions where actual behavior of either the FCC or Congress has differed from stated goals. For more on this economic theory of regulation, see Stigler (1971) and especially Peltzman (1976).

DIVERSITY OF PROGRAM SOURCES AND TYPES

The promotion of competition in the marketplace of ideas as a regulatory goal has two sources: the Communications Act of 1934 and judicial interpretations of the First Amendment. In the 1934 Act, Congress stipulated that the FCC, in its overview of the media, uphold the "public interest, convenience, and necessity." Although this mandate is quite vague, the Commission's original concern with providing a reasonable opportunity for expressing opposing views to broadcasters--that is, guaranteed access to the media--may be linked to this public interest mandate.[2] Indeed, broadcasters as part of their "public trustee" responsibilities, are required to provide such reasonable opportunities for expression on controversial issues. At the present time, programming decisions by cable operators must also abide to the FCC's Fairness Doctrine Guidelines.[3]

Judicial interpretations of the First Amendment have provided the Commission additional guidance. One such decision, *Associated Press v. United States* was especially notable. Here, the Supreme Court established that:

> The First Amendment, far from providing an argument against application of the Sherman Act, here provides powerful reasons to the contrary. The Amendment rests on the assumption that the widest possible dissemination of information from diverse and antagonistic sources is essential to the welfare of the public.[4]

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[2] See, for example, the discussion in Krasnow, Longley and Terry (1982), pp. 9-28.

[3] Equal time provisions have applied to cable operators who originated programming for a dozen years. See *Cable Television Report and Order*, 36 FCC 2d 143, 1972. Efforts have been recently directly within the FCC to repeal Fairness Doctrine requirements for cable operators; see, for example, "Will FCC Crimp Right to Rebut?," *Los Angeles Times*, Part V, September 4, 1983.

[4] *Associated Press v. United States*, 326 U.S., 1945.

Stated interpretations of these mandates by the FCC have focused largely on promoting competition in the marketplace of ideas. Consider the following statement by the FCC made during the debate over the television station-cable cross-ownership rules:

> Our adoption of these provisions--designed to diversification of control of the channels of mass communication--was guided by two principle goals both of which have long been established as basic legislative priorities. One of these goals is increased competition in the economic marketplace, the other is increased competition in the marketplace of ideas.[5]

Numerous additional references concerning the promotion of diversity in program sources and types have recently been compiled by FCC staff reports on media concentration.[6]

ACCESS TO THE MEDIA

Access is the ability of potential speakers to express views, supply information, or provide other sources of entertainment through media sources. Two interrelated factors affect access to the media: the number of "gatekeepers" and the access price. Here again, the courts have assumed an important policy role. In the *Red Lion* case, which tested the constitutionality of the Fairness Doctrine, the court established the public's "right to hear" as a preeminent First Amendment right in broadcasting. As the Supreme Court noted:

> It is the right of the viewers and listeners, not the right of broadcasters which is paramount.[7]

This interpretation of access to the video media expressed by the court

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[5] *Memorandum Opinion and Order* in Docket No. 18397, 39 FCC 2d 391, 1973; see also *Multiple Ownership*, Second Report and Order, 50 FCC 2d 1046 1074-78, 1975.

[6] See, especially, Levy and Setzer (1982) and Gordon, Levy and Preece (1981).

[7] *Red Lion Broadcasting Co. v. FCC*, 395 US 367.

combined with the commission's past history of assuring access to the broadcast media could explain the introduction of guaranteed access to a subset of cable channels in 1972.[8] Moreover, assuring access to the media has been another way for the commission to implement its stated goal of diversity of message sources. As the commission noted, access rules would:

> result in the opening of new outlets for local expression, aid in the promotion of diversity in television programming...(and) aid in the functioning of democratic institutions.[9]

The Supreme Court, however, recently ruled that the access rules imposed common carrier type requirements on cable operators which exceeded the FCC's regulatory authority.[10] Further, the Court opinion noted:

> The Commission may not regulate cable systems as common carriers just as it may not impose such obligations on television broadcasters. We think authority to compel cable operators to provide common carriage of public-originated transmissions must come specifically from Congress.[11]

Congress has recently shown interest in providing the legislation necessary to establish some cable channels for guaranteed access. In the 96th Congress, H.R. 2172 required cable operators having 20 or more channels to provide 10 percent of available channels for public, educational, and government use and another 10 percent set aside for other programmers.[12]

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[8] See *Cable Television Report and Order*, 36 FCC 2d 143, 1972.

[9] *Cable TV and Access Rules*, Report and Order, 59 FCC 2d 194, 1976.

[10] See *United States v. Southern Cable Co.*, 392 U.S. 157, 169, Vol. 20, 1968, and U.S. v. Midwest Video, 440 U.S. 689, 701, Vol. 9, 1979. However, the so-called "NARUC II" decision noted the multiproduct nature of cable firms. Here the court noted cable operators could be established as common carriers for "non-traditional" (i.e., two way non-video) services.

[11] *U.S. v. Midwest Video Corp.*, U.S., 1979.

[12] See, for example, *Broadcasting*, September 12, 1983, pp. 2830.

ECONOMIC EFFICIENCY

The FCC and Congress have shown concern over the economic structure of media markets on a number of occasions. For example, the FCC has direct responsibility for furthering antitrust laws under its public interest mandate when licensing broadcast stations.[13] This public interest concern over efficient media markets has extended to the cable television industry. Indeed, increased market power resulting from mergers between competitive media (e.g., cable and telephone) has often been used as an argument for cross-ownership bans.[14] This concern over the efficiency of media markets has been discussed at length in two FCC reports. The FCC's recent Network Inquiry, in defining the tasks of the FCC, noted:

> Although the Commission's task in developing entry and ownership policies that promote competitive forces in the video industry may not be easy, no satisfactory alternative exists...The Commission could not possibly develop standards and commit the resources to regulate the video industry in the public interest with the precision and detail that may be achieved by reliance on competition.[15]

Another FCC staff report notes quite succinctly that:

> Indeed, to the extent that competitive forces in media markets provide quality services at low prices, the First Amendment concern with promoting robust debate is well served.[16]

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[13] See Section 311 of the Communications Act, 47 U.S.C. Section 311 (1970).

[14] This is documented both in FCC statements, and the empirical research used by the commission as evidence of the need to continue certain cross-ownership restrictions. In general, the empirical research estimated reduced form models of cross-owned firms in order to detect any increased market power accruing from joint ownership. For FCC statements on the role of enhanced market power, see *Report and Order in BC Docket No. 878-101*, 75 FCC 2d, 1979. For a summary of the empirical research on cross-ownership issues, see Baer, Geller, Grundfest (1974), or Baer, Geller, Grundfest, Possner (1974), Federal Communications Commission, Network Inquiry Special Staff (1980).

[15] Federal Communications Commission, Network Inquiry Special Staff, Vol. 1 (1980).

[16] Gordon, Levy and Preece (1981), p. 29.

This focus on using market forces to guide regulatory decisions has been made most forcefully by the current chairman of the FCC, Mark Fowler. As he notes in recent Congressional Testimony:

> ...where concentrations of market power exist, as they do with respect to established telephone carriers, continued regulation may be necessary....We should be prepared, however, to eliminate regulatory barriers when it appears that regulation may be costing the public more in terms of technical progress or economic efficiency than it saves, or when changes in the market environment destroy the rational for such regulation.[17]

Finally, the recent call by the FCC to develop indices of media concentration to assess the competitiveness of media markets illustrates the continued concern over market structure.

The ability of cable firms to exercise market power could directly impact stated federal policy goals. Indeed, market power affects economic efficiency, source and program diversity and access to the media.[18] As such, the goals, and their achievement, depend in large part on the competitiveness of media markets. The interrelationship between stated goals and market power will be discussed below.

MARKET STRUCTURE AND PROGRAM DIVERSITY

A number of analysts have examined the relationship between the ownership structure of the media and its impact on the diversity of programs.[19] In general, their conclusions are mixed. Some have noted that a single owner of all programming outlets may present a more diverse set of programming.[20] Others disagree with this conclusion.[21]

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[17] See statement of Mark Fowler before Subcommittee on Communications of the Committee on Commerce, Science and Transportation, U.S. Senate, 97th Congress, April 26, 1982.

[18] For an excellent discussion of these issues, see Owen (1975).

[19] Note that this section makes a very strong assumption between market structure and market power. For a number of reasons, which will be discussed later, this connection is very tenuous at best.

[20] See, especially, Steiner (1952). As will be discussed below, however, Steiner makes very restrictive assumptions.

In large part, the divergent conclusions are directly attributable to the differences in assumptions made about the distribution of programming tastes, the number of channels available, and measures of consumer well-being. These differences will be briefly examined below.

Hotelling, in his simple models of firm location decisions made by duopolists, provided an early prototype of program choice.[22] Using Hotelling's model, competition, meaning separate owners of the programming outlets, resulted in program duplication. Unfortunately, the model is very limited in its application. For example, no equilibrium among program choices exists when three competitive programmers are assumed to exist.[23] Similar problems exist in the five programmer case, although here multiple equilibria may occur.

Steiner was the first to extend the Hotelling type model to explicitly consider the relationship between broadcast ownership and program diversity. Steiner, who measured viewer benefits as the number of viewers watching their first choice, also found that monopoly ownership of programming outlets could result in greater viewer satisfaction. Again, however, Steiner's model was rather restrictive. His model was not especially robust since it did not test for different assumptions regarding the distribution of program tastes. Indeed, in his model, he assumed that viewers only viewed their first program choices.

Owen, Beebe and M nning presented a more general model of program choice.[24] They considered both advertiser and pay supported television, different distributions of viewer tastes, different channel capacities, and a broader measure of viewer surplus. Their major contribution was to illustrate how the restrictive assumptions of past analyses affected their results. For example, by relaxing the assumption that viewers will only watch their first choices, this model points out that monopoly

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[21] See Owen, Beebe, Manning (1974), Spence and Owen (1976), Beebe (1977).

[22] Hotelling (1929).

[23] Hotelling's spatial competition model made a number of simplifying assumptions. First, he only examined the competitive interactions between two firms. Second, he assumed a market segment of finite length, characterized by a uniform population distribution. Finally, firms are assumed to costlesssly relocate (i.e., free entry with no sunk costs).

[24] Owen, Beebe and Manning (1974); also see Beebe (1977).

ownership may not provide more program diversity. These conclusions, however, remain sensitive to assumptions made regarding the distribution of programming tastes, and program costs. For example, given unlimited channel capacity (similar in theory to a larger cable system), a system of competitive programmers will result in greater program diversity under either advertiser supported or pay television. Indeed, the only instance where a single programmer, similar to the current system, could produce more program diversity is under limited channel capacity where programming is advertiser supported. This combination of advertiser supported television and limited channel capacity is not very common in the cable industry, however. Although less restrictive than previous models, the Owen, Beebe and Manning models still did not use a suitable measure of consumer surplus.

Spence and Owen, however, were able to model the relationship between ownership structure and trader surplus.[25] As they note, due to the fixed cost element of program production, competition among programmers will always result in a bias against certain types of programs. Under advertiser supported television, for example, this bias is against so-called "minority taste" programs and toward program duplication. This bias is exacerbated when channel capacities are limited (i.e., 12 channel cable system) and under noncollusive rivalry

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[25] Since Spence and Owen explicitly define benefits as consumer surplus, more powerful statements may be advanced concerning viewer welfare. Spence and Owen suggest that the necessary conditions for a welfare optimal (i.e., first best) number and type of television programs are:

1. That prices reflect marginal costs. Due to the public good nature of program distribution, programs should be available at a price of zero.

2. Total consumer surplus generated from viewing the program should equal the program cost (i.e., revenues to program producers).

Since under normal assumptions, neither advertiser supported, nor pay television satisfy both conditions, Spence and Owen compare how closely they come to first best solutions. In their analysis, they note that both pay and advertiser supported television results in "biases" (i.e., deviations from first best outcomes) against certain types of television programs.

In this context, it is important to note that, given the public good nature of television distribution, price discrimination with pay television is desirable since it moves us closer to first best solutions. Although this may produce the optimal number and type of programming, however, price discrimination may or may not have desirable distributional outcomes. For more on this point, see Spence (1976).

among broadcasters--monopolistic competition. Pay television also results in a bias against programs with high fixed costs.

ACCESS AND MARKET STRUCTURE

Access to the media is simultaneously determined by two factors: the number of gatekeepers or the access price charged. Both of these factors depend on the competitive structure of media markets. Concerns over the ability of cable operators to restrict access are not new. As early as 1970, Owen called for the separation of programming control from the cable operator. As he noted, such a policy would enable:

> the carrier to take advantage of economies of scale in the transmission process, and at the same time provide an opportunity for considerable competition among message sources.[26]

This plea for separation has been called for from a number of sources during the 1970s and has increased with the growth in the number of channels controlled by cable operators.[27] Indeed, the common perception that cable operators, as natural monopolists, have significant market power has increased the discussion over the need for guaranteeing access to the media. Here the concern is that the cable operator, through his natural monopoly position, would have the following incentives: restrict the number of channels programmed, reduce the diversity of information and program sources and discriminate against competitive message sources.

The recent position paper completed by the National League of Cities is illustrative.

> A cable operator, free of regulatory constraints, is likely to maximize profits by using his monopoly and monopsony powers. On the basis of his monopoly position, a cable operator can set the prices charged to subscribers for services largely free of all market constraints and limited only by the consumers' elasticity of demand. The operator's monopsony position likewise enable him to control the prices charged to users for access to the system. By using the pricing _

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[26] Owen (1970).

[27] See summary in Besen and Johnson (1982), pp. 1-5.

> mechanism in a discriminatory fashion to exclude competitive services from the system, the operator has the power to determine which service providers and programmers can have access to the system.[28]

To preclude this potential abuse by cable operators, some have suggested that the industry should be regulated as a common carrier. Under this regulatory regime, potential programmers would have access to cable channels on a first come, first served basis. The only other consideration under the common carrier rule would be the establishment of fees the cable operator would charge for access to channel space.

Besen and Johnson assessed the impact of mandating leased access to cable television on the number of programs offered and prices charged compared with a base case.[29] If, for example, cable operators are required to provide nondiscriminatory leased access for a subset of their channels and the access price is regulated to equal the marginal channel cost, the price for most cable programs would fall. Further, there would not be a reduction in the number of channels programmed. On the other hand, if average cost pricing is allowed in order to cover operating costs, compared to the base case, some programs will be dropped.[30] However, prices on the remaining programs will be lowered.

MARKET STRUCTURE AND MARKET POWER

The connection between market structure, market power, and welfare loss has drawn considerable attention in the industrial organization literature.[31] The assumed connection between natural monopoly and corresponding welfare losses has been challenged on a number of counts.

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[28] National League of Cities (1981).

[29] Besen and Johnson (1982).

[30] These conclusions, however, depend on assumptions regarding the cross-price elasticity of services provided by the cable operator. In addition, however, the conclusions also depend on the assumption that cable operators do not price discriminate. Yet, as will be discussed in the next chapter, price discrimination is quite common in the industry. The welfare implications of these more complex pricing schemes will be discussed below.

[31] Demsetz (1968), Baumol, Panzar and Willig (1982).

First, it ignores competition to become the monopolist. Second, structural measures, such as concentration indexes, ignore entry and exit conditions in the market. Finally, indicators such as profitability may or may not be indicative of market power or welfare loss. These caveats will be discussed briefly below.

With competitive bidding, competition to win a monopoly franchise may dissipate expected monopoly rents.[32] In this case, the firm's best strategy is to bid prices equal to its opportunity costs, leading *ex post* to a normal and not supranormal rate of return. Such competitive bidding strategies are common in the cable television industry. In order to secure a franchise, cable firms are usually required to submit bids along a wide variety of dimensions, including proposed prices, program offerings, channel capacity, technical capabilities, as well as their ability to finance the project.

Structural measures of market power also ignore the leverage local governments may exert in the franchise renewal process.[33] If local cable regulators place strong reliance on past pricing decisions in their decision to renew the franchise, monopoly pricing could be constrained. That is, if current profits by the cable operator affect the probability of franchise renewal, the cable operator may price his product below the short run monopoly level. Yet, monopoly pricing could be encouraged if current pricing decisions have little impact on the renewal probability.

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[32] Though expected monopoly rents are largely dissipated, social welfare losses under competitive bidding may exceed those suggested by the simple Harberger welfare triangle. On the other hand, the existence of sunk costs causes special problems for simple bidding solutions like those described in Demsetz (1968). For more on the extent of welfare loss resulting from competitive bidding, as well as a discussion of the special role of sunk costs, see Tullock (1967), Rogerson (1982), Goldberg (1976), Williamson (1976) and Harberger (1954).

[33] This argument relies heavily on the notion of user costs, which are the expected loss of future profits resulting from current behavior. That is, if the cable operator takes a long term view of profits, pricing will depend on two factors: short term profits (initial franchise period, plus the expected profits accruing from subsequent franchise renewals). Here, expected profits are the summed long term profits times the perceived probability of franchise renewal. See, in general, Keynes (1936); and for an application to defense contracting, Scherer (1964).

Competitive outcomes in naturally monopolistic industries may occur even without competitive bidding schemes.[34] In the absence of sunk costs, the possibility of entry by potential cable operators or other video substitutes could drive prices toward competitive outcomes. Indeed, barriers to entry and exit--the "contestability" of the market and non-market structure *per se*--are the key determinants of market power. Although theoretically appealing, two factors inhibit the contestability of cable television franchises. First, there are substantial barriers to entry and exit resulting from the sunk costs involved in cable construction. Indeed, long term, exclusive contracts are usually required to convince cable operators to undertake such specialized investments. Yet, due to the absence of sunk costs, hit and run entry by non-cable competitors (e.g., SMATV, MDS, STV, and low-power television) may provide market discipline. However, instantaneous entry by these competitors is usually precluded due to government regulation and licensing requirements which seriously undermine (at least initially) their competitive impact on cable television.[35] In sum, contestable outcomes are unlikely due to the sunk cost nature of providing cable as well as existing regulation of the conditions under which non-cable competitors may enter cabled markets.

Finally, the existence of positive profits does not necessarily reflect market power or welfare loss for at least two reasons. First, positive, or high rates of return may simply reflect efficiencies or

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[34] This is true, however, only under fairly restrictive assumptions. For example, this ignores the critical role and cost of information about prices and product quality. For example, if information acquisition costs are positive, price dispersion could exist even among relatively homogenous products. See, for example, Schwartz and Wilde (1982). In general, see Baumol, Panzar and Willig (1982).

[35] Contestable outcomes along the lines discussed in Baumol, Panzar, and Willig (1982) may be precluded if the incumbent cable operator is able to change his pricing strategy before a potential cable competitor can either enter or exit. If this is the case, which appears likely given existing license regulation, the incumbent cable operator can undertake any number of pricing strategies ranging from entry deterring limit pricing, to high pre-entry prices. Hence, as long as oligopolistic price and/or quantity interactions are feasible, contestable outcomes are unlikely. See, for example, the discussion in Schwartz and Reynolds (1983).

innovation resulting from a "superior" firm.[36] Second, high rates of return could represent premiums for higher risk to compensate investors for high variance portfolios.[37]

In sum, the importance of the economic structure of the cable television industry exceeds the traditional focus on efficiency and equity. Indeed, industry structure and the "contestability" of cable television markets influences the amount and type of information we receive, who provides it, and the prices we pay. The next two chapters will provide additional insight into the impact of competition and industry structure on diversity, access and efficiency in the video broadcasting industry.

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[36] Demsetz (1973).
[37] Lintner(1965), Sharpe (1964).

IV. CABLE REGULATION: A FRAMEWORK FOR DISCUSSION

INTRODUCTION

It is often argued that the economic structure of the cable television industry thwarts stated federal policy goals promoting program and source diversity, access and economic efficiency. These fears are based on the perception that cable operators, through exercising market power, restrict the number of channels programmed, have incentives to discriminate against competing message sources, and restrict the number of subscribers served. These fears neglect three important factors. First, they presume a connection between market structure (i.e., natural monopoly) and market power. As was discussed in the previous chapter, however, such presumptions are often misleading.

Second, the fact that television signals are public, and not private goods, has been ignored largely by cable policymakers. From a public policy standpoint, however, this distinction is very important. Indeed, policy prescription--such as directing that prices equal social marginal costs--which increase total welfare in the case of private goods may or may not be socially desirable in the public goods case.

Next, most of the discussion has focused on the structure of the industry, rather than actual pricing behavior. Fears that cable operators will adversely impact federal policy goals have assumed that cable operators set monopoly prices for each channel of programming. Cable operators, however, routinely price discriminate.[1] The policy implications of these pricing patterns have received comparably little attention. Indeed, setting monopoly prices for each channel--which rarely occurs, yet is implicitly assumed in the policy debate--has very different impacts on policy goals than existing patterns of price discrimination. Hence, normative policy prescriptions touting the

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[1] Price discrimination is broadly defined as cable operators charging different prices that do not correspond to actual costs. Hence, any pricing schemes that are quantity dependent (e.g., two part tariffs, block tariffs, marginal quantity discounts, or average quantity discounts) are examples of price discrimination.

virtues of regulation should compare the impact of regulatory alternatives to existing pricing behavior in the cable industry.

Finally, policy proposals (e.g., increased/decreased regulation) generated solely from static efficiency notions are incomplete. Indeed, given the substantial specialized capital investments sunk by cable operators, long-term relationships (contracts) between cable firms and regulators will always exist. Here, dynamic notions of efficiency will be important. Hence, certain types of regulation offered to correct static inefficiencies may or may not be desirable in a dynamic context.

THE PUBLIC GOOD NATURE OF TELEVISION

Television programs and broadcasts are public goods since it is possible, at no cost, for additional persons to enjoy a given quantity of them. Thus, the social marginal costs of television viewing are zero. Three conditions have been established which would generate the optimal number and type of television programs produced and broadcasted.[2] First, due to the public good nature of programming, television viewing should be available at no charge. Second, revenues to program producers--and correspondingly total costs to viewers--should equal total surplus. This condition guarantees that all programs yielding a positive contribution to total surplus which exceed production costs will be produced. That is, it is desirable to produce programs where social benefits exceed social costs. Finally, profits must be non-negative to ensure program production.

These optimality conditions are problematic, however. Providing television at no charge would lead to no production unless subsidized by some other means such as advertising or government support. Advertiser support fares poorly under the second optimality condition, however, since it aims to maximize audience size rather than total surplus. Thus, programs which provide positive net benefits and "should" be produced often are not.

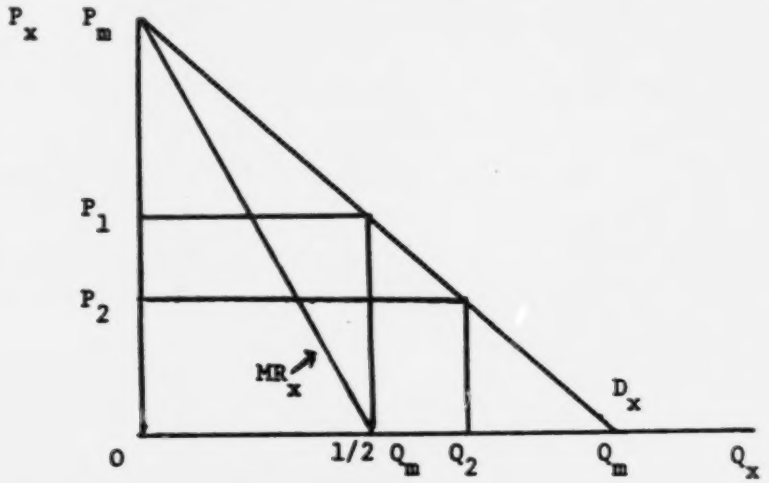
Pay television, in contrast, violates the first optimality condition mandating a zero price, yet through the pricing mechanism, often comes closer to achieving the second optimality condition. Thus, policymakers face a basic dilemma between the inefficient pricing of pay

[2] See Owen, Beebe and Manning (1974), Spence and Owen (1976).

television and the failure of advertiser support to respond to the intensity of preferences.

One immediate implication of this discussion is that lower pay cable prices may not necessarily increase total welfare. Again, although lower pay cable prices do move us closer to social marginal costs, such a policy decision could actually lower total welfare by performing poorly according to the second optimality measure. To illustrate, consider the following Figure 4.1. Consider the total demand revealed for program type X resulting in an area of total surplus equal to P_mQ_m0. Assume that the cable operator sets a single price for this program, thus maximizing his revenues (and profits) at price P_1. Further assume that the program production costs are slightly less than expected program profits. Now suppose, following the normative regulatory policy prescriptions usually applied to private goods, that the pay price is lowered to P_2. Thus regulation moves us closer to the social marginal cost of zero. However, by lowering the price charged, thus moving away from the profit maximizing price, would reduce total revenues which may not allow the programmer to cover his programming costs. Thus, the program would not be produced--even though social benefits exceed costs-and all surplus from the production of this program would be lost. Hence, following this pricing rule, too few programs may be produced. Thus, when selecting among the set of potential second best solutions, lower pay cable prices may not yield an increment in welfare in the public goods case.

Fig. 4.1.-- IMPLICATIONS OF RATE REGULATION FOR A PUBLIC GOOD



The illustration above simply reiterates the policy dilemma between advertiser and pay supported television that economists have pointed out for years. Current cable policymakers, by failing to recognize both the public good nature of cable programming, and the inherent optimality trade-offs under pay television, may be prescribing public policies which actually reduce rather than increase social welfare.

Instead of uniformly prescribing lower prices, public policies most likely to move us closer to an "optimal" number and type of programming include:

- *Combination of Pay and Advertiser Supported Television*. Combined advertising and pay television would allow viewers to express the intensity of their preferences while advertising could partially subsidize the costs of production allowing lower pay prices.

- *"Unlimited" Channel Capacity*. Larger channel capacities would allow more programs--thus adding to total surplus--to be viewed than would smaller channel cable systems.

- *Price Discrimination*. Price discrimination would bring total system revenues closer to total surplus. Thus, firms that price discriminate are more likely to produce and carry television programming that "should" be produced. The welfare implications of current price discrimination schemes employed in the cable industry will be discussed in the next section.

EXISTING PRICING PATTERNS IN THE CABLE INDUSTRY

Much of the concern over cable's natural monopoly has focused on its alleged ability, through exercising monopoly pricing powers, to adversely affect stated policy goals. In particular, there continues to be concern that cable operators could charge high prices, restrict the number of and diversity in programs, and reduce access to the media. One critical determinant of how cable affects these policy goals centers on its pricing practices. Cable operators, when pricing cable services, use relatively complex pricing strategies. In general, most cable firms do not charge on a per channel, or per program basis. Instead, most cable firms offer blocks of programming together for a single price. Further, volume discounts are generally offered when purchasing more blocks of programming. These pricing strategies have been recognized previously as subtle forms of price discrimination known as block

booking or more generally as commodity bundling.[3] Commodity bundling can assume a number of forms, including:

1. *Pure Bundling* (Block Booking)--where the products (programming) are only sold jointly.
2. *Mixed Bundling*-- where the products are sold as a package and only one is sold separately.

Compared to simple monopoly pricing, the use of commodity bundling has three important effects: first, these pricing schemes may or may not reduce the allocative inefficiencies associated with simple monopoly pricing; second, these complex pricing schemes allow the cable operator to provide more programming than under simple monopoly pricing; and third, the distributional implications of each of these pricing schemes are likely to be very different. As presently structured, cable programming is sold in bundles. Cable operators usually offer the so-called "must carry" local broadcast stations, in addition to varying numbers of satellite, advertiser supported stations on the "basic" service package.[4] In addition, some cable operators provide, again on an all or nothing basis, expanded basic tiers. Expanded basic provides additional satellite fed advertiser (and cable) supported programming. In general, expanded basic programming cannot be purchased without first purchasing the basic cable package. By the same token, pay supported cable stations also cannot be purchased without basic cable service.

Cable operators also bundle pay programming services together. As noted in Fig. 4.2, two general patterns have emerged in the industry. The first pattern is very similar to the mixed components bundling previously mentioned. In general, these pricing schemes may often be similar to tying or block booking. In order to purchase the Nashville Network, subscribers would also have to purchase HBO and Showtime.

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[3] Stigler (1963), Adams and Yellin (1976). The fact that cable operators use commodity bundling schemes is *prima facie* evidence of market power. In addition to the price discrimination explanation, it is important to note the technological incentives for these pricing practices. For example, the billing costs are much more expensive on a per channel basis. Further, until recently, it was very expensive to sell individual channels to subscribers.

[4] 57 FCC 2d 625 (1976).

A number of cable firms have also used the mixed bundling approach to price their cable services. Under mixed bundling schemes, consumers receive volume discounts as they purchase more pay (or other cable) programming. As noted in Fig. 4.2, the price of HBO or the Movie Channel is $11.95 if only one movie channel is purchased. However, if they are both purchased, the combined price falls to $19.90 rather than $23.90.

The particular type of commodity bundling employed by a cable firm could have very different welfare implications. To see this, we shall compare these different bundling schemes to simple monopoly pricing in terms of their impact on the number of subscribers served, economic efficiency, and the number of channels programmed. To simplify the analysis, we shall focus on a cable firm that offers two pay television

Fig. 4.2 -- CABLE TELEVISION BUNDLING (PACKAGING PRACTICES)

Type 1. Mixed Components

Price	Service
$ 8	Basic
16	Basic + HBO
24	Basic + HBO + Showtime
39	Basic + HBO + Showtime + Bravo + Playboy or Disney Cinemax + MTV + Nashville + Daytime + Cable News Network II + Satellite News Channel I and II

Type 2. Mixed Bundling

Price	Service
$ 8.75	Basic (12 Channels)
20.70	Basic + HBO or The Movie Channel
28.65	Basic + HBO + The Movie Channel

Source: Paul Kagan, Pay TV Newsletter, various editions, 1983 and "The Rainbow Tiering Model," Rainbow Programming Services, 1983.

packages--for example, HBO and the Disney Channel. Consumers will purchase a product if their willingness to pay for the program exceeds the price established by the cable operator. To illustrate, consider the following diagram (See Fig. 4.3). The reservation prices of each consumer in a particular cable franchise area is revealed on each axis.[5] Since two products are under consideration, each consumer can be represented by a joint distribution of reservation prices. Cable firms that use "simple" monopoly pricing rules will establish only one price for each product. This price shall be called the simple monopoly price and is represented by PD and PH in Fig. 4.3. Due to the public good nature of cable programming, the true social marginal costs of providing service to an additional customer is zero.[6]

Given these prices and marginal costs, simple monopoly pricing breaks our diagram into four quadrants.[7] Those consumers whose joint reservation prices appear in quadrant 3 do not purchase either program since their reservation prices are less than the product prices. Consumers with joint reservation prices in the first quadrant purchase both program services since their individual reservation prices exceed the prices of the products. By the same reasoning, consumers in the second quadrant purchase only program HBO, whereas those consumers with joint reservation prices in the fourth quadrant only purchase Disney.

Use of commodity bundling does not necessarily increase consumer welfare. Welfare may increase or decrease depending on the underlying cost structure, and the particular bundling scheme employed, as well as the cross-price elasticities between the bundled products.[8] As an

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[5] Reservation prices are simply the maximum amount a consumer is willing to pay for a product.

[6] Even though the marginal cost observed by cable firms is not zero--due to fees they must remit to cable programmers--the appropriate marginal cost to use for welfare analysis is the social marginal cost. Of course, the marginal cost of providing service to an additional customer also includes installation costs. However, installation fees are often waived, or greatly reduced. Further, once amortized over the expected time a subscriber is expected to have cable service, the marginal costs are very low. Hence, the marginal costs are likely to be close to zero.

[7] This approach is borrowed from Adams and Yellin (1976).

[8] This implies that with appropriate knowledge of the joint distribution of reservation prices for programming, and marginal costs, that profit maximizing commodity bundling pricing strategies exist. As

Fig. 4.3

IMPACT OF SIMPLE MONOPOLY PRICING ON PURCHASING DECISIONS

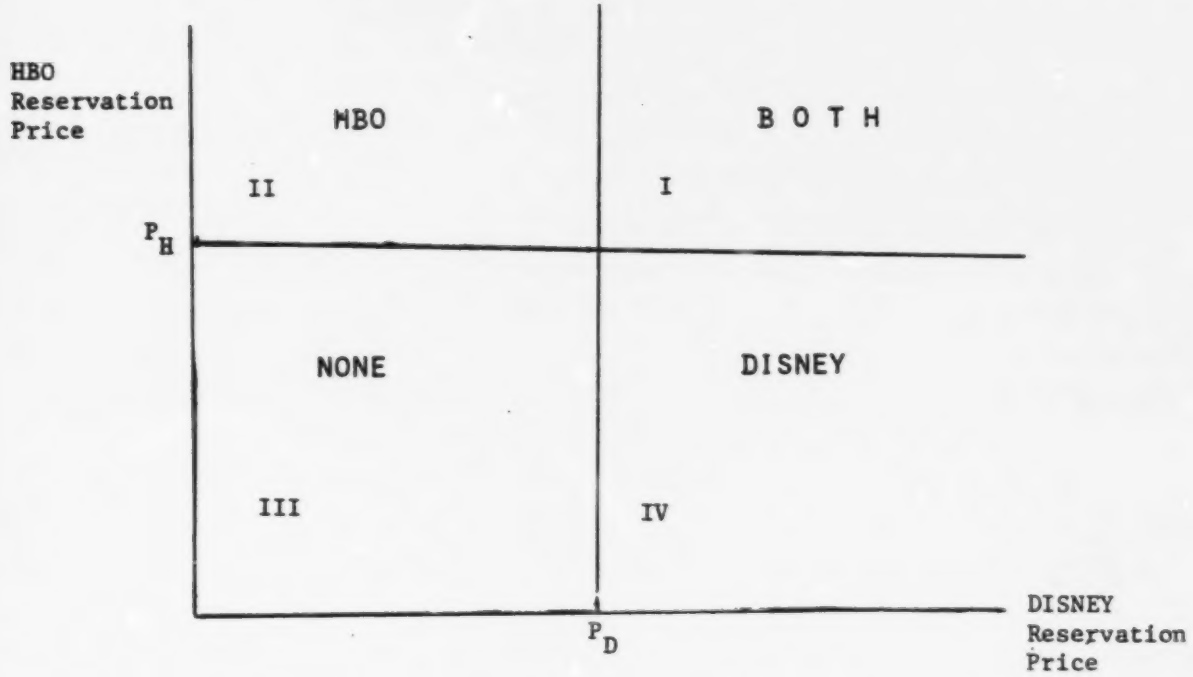
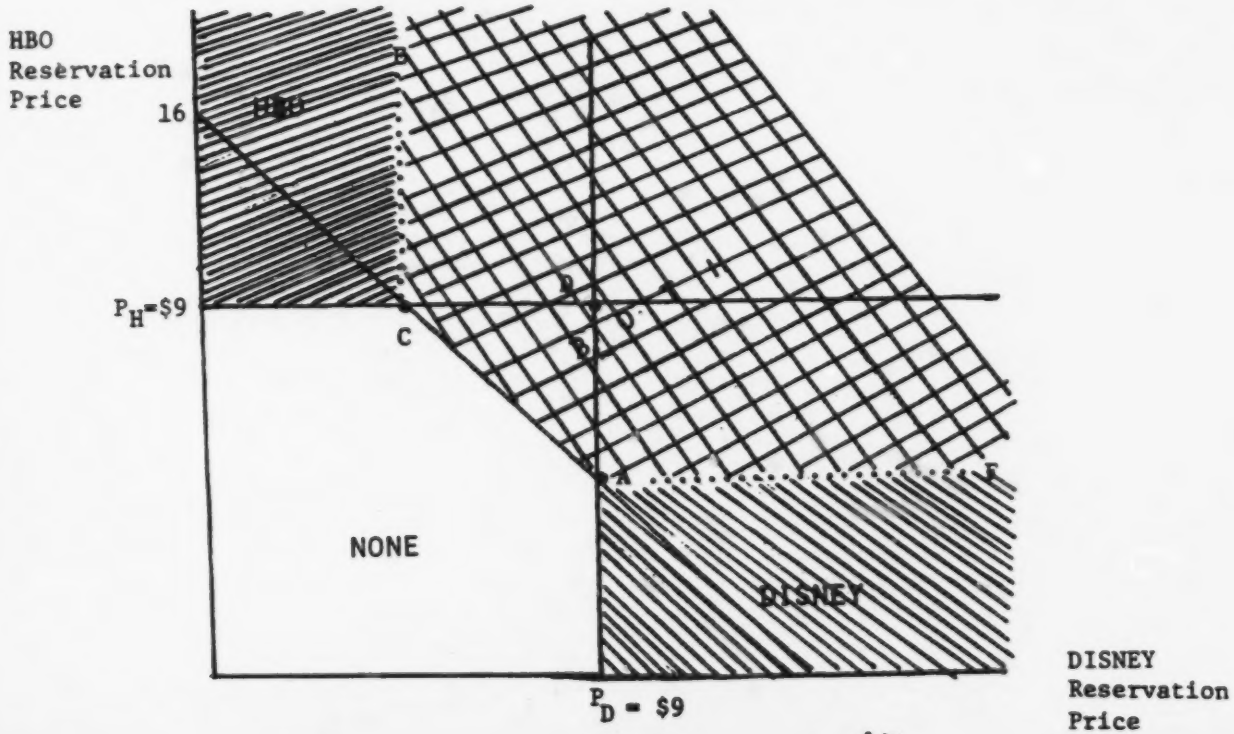


Fig. 4.4

IMPACT OF COMMODITY BUNDLING ON PURCHASING DECISIONS



illustration, consider the example shown below.

Compared to simple monopoly pricing, consumer welfare could increase if the cable operator employed a mixed components pricing strategy.[9] Suppose the cable firm offers consumers the same stand-alone prices (e.g., each program costs $9), but in addition offers a volume discount--say, of $2--when both programs are purchased. Hence, the bundle price for both goods is $16. In Fig. 4.4, this bundled price can be represented by a straight line intersecting $16 on both axes. In this case, consumers in quadrant 1 are unambiguously better off since they purchase the same amount of programming, but at a lower price. Consumers whose joint reservation prices are in area DCA now purchase both products and therefore receive a net monetary gain through consuming these programs. The impact on other consumers, however, is somewhat more complicated. First consider those consumers with joint reservation prices bounded by area PDAF. These individuals purchase Disney since their reservation prices for Disney exceed $9. They do not, however, purchase HBO since their reservation price for HBO is less than the implicit price of HBO given that they are willing to purchase Disney.[10] In contrast, consumers with joint reservation prices in area DAF purchase both programs since their reservation prices for Disney

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one might expect, a number of different consulting firms have developed different bundling strategies which are, in part, determined by this information. Phillips (1980).

[9] Clearly, there are number of different possible commodity bundling pricing schemes, each of which have different welfare implications. The approach illustrated above is analyzed since it is common among cable operators offering two pay television packages. However, due to the diversity in pricing, and programming decisions in the industry, easily generalizable welfare statements are not possible. It should be noted, however, that as long as the simple monopoly price exceeds marginal programming cost, there is some nonlinear (i.e., quantity dependent) pricing strategy that is potentially *Pareto optimal*. See, for example, Willig (1978).

[10] That is, the implicit price for HBO is $7. As the figure reveals, however, consumers in this area have reservation prices for program type R which are less than $7.

exceed its price, and their reservation price of HBO exceeds the implicit price of HBO given that they are willing to purchase Disney. Note that consumers in this area previously purchased only Disney. Hence, they also enjoy a net increase in consumer surplus. Using the same reasoning, consumers with joint reservation prices in area PHCE consume only HBO. They are not affected by the bundled pricing scheme, and therefore are held harmless. Further, consumers in area ECD now purchase both programs and since they previously only purchased one, enjoy a net increase in consumer surplus. Finally, consumers in area PHCAPD still do not purchase any programming, hence, they are not affected by the bundling scheme. In this case, bundling improves welfare compared to simple monopoly pricing.

IMPACT OF BUNDLING SCHEMES ON THE NUMBER OF CHANNELS PROGRAMMED

Block booking and commodity bundling will, compared to simple monopoly pricing, increase the number of channels programmed. Given the large number of program services offered by cable operators, it would be quite costly to determine the profit maximizing prices for each program service offered. To economize on transaction costs, and exploit differences in the distribution of reservation prices across consumers, cable operators set a single price for a block of programming services. This may be thought of as a form of price discrimination since the implicit prices that consumers pay for each program are different.

With knowledge of consumer tastes for programming, (i.e., the joint distribution of reservation prices) cable operators can devise a commodity bundling pricing scheme that is more profitable than simple monopoly pricing. Since cable operators will add an additional program as long as the marginal program revenues exceed the marginal program costs, these nonlinear pricing schemes, due to their enhanced revenue-producing potential, allow the cable operator to program more channels. Hence, these more complex pricing schemes often make it profitable to provide programming that otherwise may not have been economically viable.[11]

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[11] For a general discussion of the impact of price discrimination on product choice, see Spence (1976).

LONG TERM CONTRACTS AND DYNAMIC EFFICIENCY

Much of the recent policy debate over the "need" to regulate cable television has focused on cable's natural monopoly, market power and competition from other video media. In many instances, public policy prescriptions have followed very simple guidelines: if market power exists, then regulate; otherwise do not. Indeed, many have stressed the need to protect consumers from the monopoly pricing powers of cable operators. This simplistic framework ignores many of the important elements of the structure of cable regulation. Specifically, it ignores the role of long term contracts in the regulatory process. Given the specialized technology of cable operators, long term franchise agreements will always assume an important regulatory function.

The construction of a cable television system requires an enormous initial investment in specialized capital equipment. These technological conditions create special problems for regulators. First, specialized capital equipment creates quasi-rents which may be appropriated during the contract period.[12] Second, the transaction costs of monitoring a long term relationship between the cable firm and the regulator are significant.[13] To economize on the sizable transaction costs, long term contracts are standard in the cable industry. The terms of the initial franchise agreement, however, are critical determinants of the quality of the cable system. When structuring the initial agreement, however, local regulators face some important dilemmas. Potential bidders for the cable franchise base their bids on expected profits of the enterprise. Larger expected profits increase the likelihood that potential bidders will install cable systems of higher "quality." Local regulators have substantial influence over a number of factors influencing the profitability of a cable franchise. This power stems from regulator's control over:

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[12] The quasi-rent value of an asset is the excess of its value over its salvage value (i.e., its value in its next best use to another renter). See Klein, Crawford and Alchian (1978).

[13] Williamson (1976).

1. *Competitors to the winning cable system.* Cable regulators, for example, can guarantee the winning bidder an exclusive franchise agreement. In addition, regulators may have some control concerning the terms of entry and operation of potential competitive technologies such as SMATV.

2. *The contract length.* Longer contract lengths mean greater expected profits. In addition, longer contracts also reduce the problems that result if the contract length is less than the life of the specialized capital equipment.

3. *Contract renewal expectation.* A larger expected probability of contract renewal leads to greater *expected* profits.

On the other hand, more profitable cable franchises, in part influenced by the terms of the franchise agreement, may entail costs to consumers such as higher prices, and potentially inhibiting the ability to adopt newer, cheaper substitutes to cable television. Indeed, the structure and administration of long term cable franchise agreements have tremendous influence on both the rate of innovation as well as the type (quality) of cable system initially installed. Hence, the "appropriate" trade-off between protecting the cable firms "right to serve" and the consumer's "right to be served" must recognize these potentially competing demands.[14]

One critical public policy question concerning regulation in the cable industry is how to manage and administer long term cable franchises to further stated policy goals. As noted above, this involves a larger number of regulatory tools than some of the current debate implies. In this sense, the "need" to regulate cable television should not reduce to the simple dichotomy. if market power exists, then regulate, otherwise do not. Clearly, *all* cable firms have some market power stemming from product differentiation, significant sunk costs, as well as any regulatory barriers to entry that may exist. Hence, the interesting public policy issue is how--given the specialized, sunk cost nature of cable television--to structure long term cable franchise contracts to further stated federal policy goals.

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[14] Goldberg (1976).

Within the larger regulatory umbrella of long term contracts, cable regulators must make a number of shorter term allocation decisions--that is, they have to administer the contract. Perhaps the most important short term allocation decisions involve devising methods to allow cable operators to adjust prices and quality within the contract period. Although there are a plethora of price adjustment arrangements with different benefits and costs available, the most commonly used are complete pricing freedom, and some form of price regulation. These price and quality adjustment mechanisms will affect the rate of innovation in the industry as well as shorter term impacts on economic efficiency, program diversity, and access. Due to the paucity of time series data, as well as complete information on significant aspects of past cable contracts, this paper will not provide empirical insight concerning the impact of different franchise arrangements on the rate of innovation. On the other hand, the next chapter will consider the impact of alternative price and quality adjustment mechanisms within long term cable franchise agreements on prices and the number of programs offered by the cable operator.

V. IMPACT OF COMPETING TECHNOLOGIES ON CABLE TELEVISION

This chapter will provide an empirical examination of the impact of video competition--particularly from over-the-air broadcasting and subscription television--and rate regulation on the short run market power of cable firms.[1] This study should provide useful information to policymakers when devising means to adjust prices within long term cable franchise agreements.

There are a number of possible methods available to document the competitive impact of video technologies on cable firms. One useful method is to analyze a cross-section of cable firms, each of whom face different levels of competition, and observe variations in their market power. Of course, this approach requires a measure of market power. A number of approaches have been used to measure market power, including firm profitability, structural measures (i.e., n firm concentration ratio), Tobin's Q, and price-cost margins. As discussed below, the first three measures will not be used in this study.

The existence of positive economic profits is not, by itself, a measure of market power. Positive profits may reflect a number of conditions, including scarcity rents created by government franchise agreements, a risky venture, or simply that the company is a "superior"

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[1] The focus of the study on over-the-air television and STV, to the apparent exclusion of other forms of video programming outlets is quite deliberate. First, detailed data on MDS penetration was not available. However, even a cursory examination of the relevant penetration data reveals that MDS and SMATV rarely compete directly with cable. With respect to MDS, the reason is rather simple. Of the 570,000 subscribers presently taking MDS services, 66 percent receive programming from Home Box Office. Another 11 percent of MDS subscribers receive their programming from Showtime or the Movie Channel (Kagan, 1983). Hence, less than one-quarter of all MDS subscribers receive programming other than that provided by the three largest pay programmers. Thus, in areas which could technically receive either MDS or cable, incentives for direct competition are either reduced, or contractually prohibited. Of course, there are important exceptions. Cable firms in Dallas and Milwaukee, for example, face direct competition from both STV and MDS. Here, the MDS programming provided is not available over cable television. Although SMATV does compete in other markets with cable sufficient subscriber data was not available.

firm.[2] Indeed, even competitive firms may earn economic rents simply because they are superior enterprises. Further, one would rarely be able to collect the relevant cost data. Instead, one would have to rely on accounting rates of return as a proxy for the variable of interest, the economic rate of return. The use of accounting data, however, to infer market power may be quite inaccurate.[3]

Use of structural measures, like concentration ratios, or the Herfindahl index, are also problematic. These measures ignore possible entry and exit barriers and are complicated by problems involved in defining the relevant product market.[4] Finally, highly concentrated industries characterized by significant barriers to entry still may not display elements of monopoly welfare losses. Indeed, even with a small number of firms, monopolistic outcomes could be precluded depending on the degree and type of pricing interdependence in the industry.[5]

Tobin's Q, which is the ratio of the market value of a firm to the replacement value of its physical assets, is a useful measure of long run market power.[6] Its use stems from the fact that a firm's market value reflects the present value of all expected profits. On the other hand, Tobin's Q ignores the important role existing tax laws have on the market value of a firm. Indeed, high market selling prices may reflect high expected future profits as well as tax benefits resulting from the sale. The importance of tax laws in bidding up selling prices in media industries appears substantial.[7] Hence, what may appear to be long term market power by the Q measure may, in part, reflect high market prices due to current federal tax laws. Since in practice it may be very difficult to separate these two determinants of market value, this approach will not be employed.

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[2] Lintner (1965), Demsetz (1969, 1973).

[3] Fisher (1979), Fisher and McGowen (1983).

[4] For a discussion of these problems, see Fisher (1979).

[5] Indeed, if conjectures are made in quantity space, outcomes ranging from monopoly to competition emerge. Further, if conjectures are made in prices, competitive pricing outcomes could also result under Bertrand assumptions. See Kwoka (1979).

[6] See Salinger (1984) for a recent discussion and use of this measure of market power.

[7] See Dertouzos and Thorpe (1982) for a discussion of the role of tax laws in motivating mergers in the newspaper industry.

MULTI-PRODUCT LERNER INDEX

One indicator of market power is the ability to raise significantly prices above costs without total loss of customers. This indicator of market power is useful for two reasons. First, higher cable prices reduce the number of cable subscribers served and increase the welfare losses in the industry.[8] Second, the ability to set high subscriber prices implies an increased ability to set high access fees to potential programmers.[9] Hence, market power, by this definition aversely affects two of the three stated federal policy goals in the communications industry. The most elementary measure employing this definition of market power is the Lerner Index.[10] According to this index, the

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[8] Assuming that the cable operator does not price discriminate, and using linear demand curves, the welfare loss (w) associated with monopoly pricing can be approximated by the following (assuming changes in price and output are relatively small). The Harberger welfare loss measure is as follows:

$$W = (1/2)\ \Delta P\ \Delta Q$$

where delta P represents the dollar amount that prices exceed the competitive price and delta Q is the deviation in units of output that the monopoly output differs from the competitive output.

This can be rearranged to yield the following:

$$W = (1/2P)\ Q\eta d^2$$

where d is price-cost margin, $((P-mc)/_P)$, η is the own-price elasticity of demand, q is the product output and p is the final product price. Hence, welfare losses increase quadratically with the relative price distortion away from competitive (marginal cost) pricing, and as a linear function of the own-price demand elasticity. See Harberger (1954).

[9] In general there are two problems stemming from monopoly: resource allocation and income distribution. Assuming the cable operator has some market power, and does not price discriminate, higher deviations of price from cost implies larger welfare losses, and a larger redistribution of income from consumers to the cable operator. Further, greater price-cost margins imply an increased ability to set high access fees to the cable system. On the other hand, there are a number of methods the cable operator can employ to price discriminate. Most cable operators, for example, provide volume discounts when purchasing more channels of programming. In some cases, when these discounts are used, the welfare losses associated with monopoly may be reduced, but the distributional concerns remain.

[10] The Lerner Index has been used on a number of occasions to measure market power. Although the Lerner Index provides useful

ability of any firm to increase prices above marginal costs is constrained by the elasticity of demand for the product. That is, a monopolist with entry into the industry blocked, through some combination of entry or exit barriers, maximizes profits in the following manner.

$$\frac{P-MC}{P} = \frac{1}{\eta}$$

Where P represents the product price,
MC is the firm's marginal cost and
η is the own-price elasticity of demand facing the firm.

The greater the elasticity of demand (i.e., more elastic) for cable services, the lower the price-cost margin. Here, a firm cannot increase price as much above marginal cost as another firm facing a more inelastic demand for cable service. Hence, the firm facing the more elastic demand would, *ceteris paribus*, be constrained in its ability to set higher prices for cable services or higher access fees to potential programmers.

Given appropriate knowledge of prices and the own price elasticity of demand, one could, through inferring marginal costs, indirectly calculate price-cost margins. This approach is often useful, especially in industries where marginal cost data are very difficult to identify.[11] The actual calculation of price-cost margins in the cable industry, however, are more difficult because cable operators are multiproduct firms. Therefore, the prices a profit maximizing cable operator would charge depends on a series of complex relationships between the relevant own and cross-price elasticities of the products produced.[12]

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information about the extent of resource misallocation and pricing flexibility, it is limited as a normative tool for prescribing regulatory interventions. For example, firms with significant fixed costs may have a large price-cost margin, yet in the long run make zero economic profits.

[11] For recent attempts see Rosse (1970), or Dertouzos and Thorpe (1982).

[12] Specifically, it can be shown that price-cost margins for a profit maximizing multiproduct firm are determined in the following manner.

Entry conditions in the industry will also affect the price-cost margins of cable operators. If, for example, there exists a competitive fringe of firms supplying similar video programming, pricing decisions by the cable operator would be constrained by its residual demand curve rather than the market demand curve.[13] Further, pricing behavior of the cable operator in the case of entry will also be a function of the cable operators conjecture of how the competitor will compete along both price and product selection dimensions.[14]

To assess the impact of competition on cable television, a single summary price-cost margin for each cable operator will be constructed. This indexing approach will be used for a number of reasons. Most notably, cable operators have substantial freedom in choosing pricing strategies in response to competition. Indeed, these pricing responses for individual services (e.g., basic, expanded basic, and pay packages) will vary according to a number of factors that we may or may not be able to measure. As the first order conditions for profit maximization

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$$\frac{P_i - MC_i}{P_i} = \frac{1}{\eta_i} + \frac{1}{\sum_{i=1}^{j} S_i/S_j} \cdot CE_{ij}$$

Where P is the specific product price, MC is the marginal cost associated with the individual product, η is the own-price elasticity of demand, CE is the cross-price elasticity of demand and S indicates the share of total revenue (j) received from product (program) i. See Needham (1978).

[13] That is, the elasticity of demand facing a single seller is,

$$\eta_i = \left(\frac{Q_o}{q_i}\right)\eta + \left(\frac{Q_s}{q_i}\right) E$$

where η is the market demand elasticity, E represents the elasticity of supply of potential competitors with respect to the market price, Qo is the total quantity demanded, Qs is the total quantity supplied by all firms, and qi is the amount supplied by firm i. For its derivation, see McCloskey (1982).

[14] Cowling and Waterson (1976), Dickson (1979), and Applebaum (1982).

for a multiproduct firm indicates, price-cost margins for any particular product depends crucially on the cross-price elasticities between the goods sold.[15] For example, in the cable industry one would expect to see different price-cost margins for cable operators offering HBO and the Disney Channel compared with one offering Showtime and the Movie Channel. This stems from the fact that the cross-price elasticities of HBO with respect to the Disney Channel are probably lower than the cross-price elasticity of Showtime with respect to the Movie Channel. Hence, low or high price-cost margins for individual program services may reflect a number of factors, including the own and all relevant cross-price elasticities as well as the programs contribution to total system revenues. Therefore, the examination of a single price-cost margin could be misleading unless special care was taken to control the composition of pay program packages.

In sum, to facilitate comparison across cable firms, I will create a single price-cost margin. The price-cost margin will represent a weighted average (weighted by its share of total system revenues) of each of the program specific price-cost margins.[16] The dependent variable I will use appears below.

$$PCM = \left[\sum_{i=1}^{j} \left(\frac{P_i - MC_i}{P_i} \right) \cdot \left(\frac{P_i Q_i}{P_Z Q_Z} \right) \right]$$

where P_i is the price of the particular service offered by the cable operator, MC is the marginal programming cost for the ith service, summed over all j services, and $P_Z \cdot Q_Z$ represents total system revenues.

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[15] Phillips (1980), also see footnote 12.

[16] Although I could have directly estimated the equation suggestion in footnote 12, the revenue shares are endogenous. Hence, through simple algebraic rearrangement, I have placed all endogenous variables on the left hand side resulting in each individual price-cost margin weighted by its share of total system revenues.

DETERMINANTS OF PRICE-COST MARGINS

Demand and cost conditions in the cable industry will affect the relative magnitude of their price-cost margins. Relevant demand side factors are those affecting the own-price elasticity of demand for cable television, including the availability of substitute products such as STV and good television reception. In addition, regulatory interventions, especially rate regulation, could affect the price-cost divergence.

Cost conditions in the industry also affect the relative size of price-cost margins. The most important marginal cost incurred when a new subscriber either initially purchases cable, or simply purchases more cable services, is the marginal license fee paid to programmers.[17] That is, most major programmers offering either advertiser supported or pay programming charge cable operators a certain monthly license fee per subscriber per month. Some examples of these license fees appear below (see Table 5.1).

In general, license fees that cable operators remit to program packagers depends on the total number of subscribers served by the operator. If the cable firm is a member of a group (multiple system operator), the price would depend on the total number of subscribers purchasing program type x at the *group level*. Cable firms that are not members of groups may also receive volume discounts--based on the number of subscribers served in the franchise area--or they may receive performance discounts when available. Performance discounts depend, in general, on the total number of cable subscribers purchasing a particular program. As Table 5.1 illustrates, the price cable operators

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[17] Other factors to consider could include drop lines--which include installation charges, splitters, traps, and amplifiers--and converters. These were not considered for a variety of reasons. First, all of the marginal costs cited here are one time charges. Once amortized over the expected length of time a subscriber is expected to have cable service,they are not very important. Further, except for labor costs, there is little cross-sectional variation in these charges. (Although converter prices do vary as a function of the size of the cable group, or total subscriber base). Finally, once the initial hook-up has been completed, and the subscriber decides to either upgrade his services, or a new subscriber moves into the premises, marginal costs are substantially less. Given the data at hand, it would be impossible to distinguish between these latter two types of customers.

Table 5.1

LICENSE FEES FOR BASIC TELEVISION SERVICES, 1983

BASIC SERVICE	FEE (Per subscriber Per Month)
Arts	Free
Christian Broadcast Network	Free
Cable Health Network	Free
Cable News Network	0.20, 0.15 if take WTBS
CNN Headline News	0.05, free if with CNN
C-Span	0.03
Daytime	Free
ESPN	0.10
Music Television	Free
Nashville Network	Free
Nickelodeon	0.10 - 0.15
Spanish Info. Network	(a)
USA	0.07 - 0.13
WGN	0.10
WOR	0 - 0.10
WTBS	0.10 for first 18,000 subscribers; zero for additional.
PAY TV SERVICE	
HBO	3.10 - 5.00 (b)
Showtime	3.08 - 5.00 (b)
The Movie Channel	3.75 - 4.60 (c)
Prism	5.25 - 6.75 (d)
Cinemax	2.66 - 4.25 (b)

(a) .07 if USA is on Basic Service; up to .13 if on Expanded Basic.
(b) Price varies depending on the number of subscribers and the price charged to subscribers.
(c) Price varies depending on the number of subscribers.
(d) Price varies depending on the price charged to subscribers.

Source: Paul Kagan, The Cable TV Program Databook, May 1983, plus conversations with relevant basic pay cable program representatives.

are charged by HBO, Showtime, Prism and Cinemax, depends on the price the cable operator charges subscribers for access to the programming. For example, suppose a cable firm is owned by a group that has 100,000 HBO subscribers. Now assume, the cable operator, who presently charges

subscribers $9.00 for HBO, decides to increase the price to $10.00. In the near future, the price the cable operator pays HBO would increase from $3.76 to $3.84 per subscriber. Showtime has a similar pricing strategy. The Movie Channel, however, only charges cable operators according to the number of subscribers served.

Vertical integration of cable operators with program packagers will also affect the firm's price-cost margin. Vertically integrated firms, if they are profit maximizing, would *internally* transfer programming inputs at their true social opportunity costs. Due to the public good nature of programming, the marginal social costs are zero. Hence, the price-cost margins of vertically integrated cable firms may be larger than other cable systems.[18]

Given that both demand and cost conditions in the industry affect price-cost margins, it is important for purposes of this study to isolate empirically the demand side effects. Price-cost deviations resulting from ownership patterns should not be confused with market power resulting from demand side factors. One way to focus on the demand side factors affecting price-cost margins is to stratify the sample by group size. Once stratified, one can examine the variables of interest across the various samples to determine the impact of competition on the pricing decisions of cable firms. In addition, we can compare the stratified samples with the full sample to determine the influence of supply versus demand side factors on the summed price-cost margin measure. (See Appendix 7.)

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[18] Vernon and Graham (1971). Both cable operators and program suppliers face downward sloping demand curves--that is they are serial monopolies. In general, one may not easily determine whether the price-cost margins of serial monopolists are smaller than vertically integrated firms. Serial monopolies charge higher prices than vertically integrated firms. However, vertically integrated firms have lower marginal *programming* costs. The ultimate outcome depends on whether the lower final product price resulting from integration is less than the reduction in marginal costs. Given the large pay programming markups over marginal costs (anywhere from $3-$5), one would expect that the reduction in marginal programming costs resulting from vertical integration would swamp the reduction in final product price. Even a cursory examination of the relevant data provides strong support for this assumption.

NON-PRICE COMPETITION

The competitiveness of media markets will also affect the number and variety of programs a cable firm offers. However, we cannot make an unambiguous *a priori* prediction of which market structure will lead to a greater number of programs or more program diversity. Cable firms that do not currently face competition from pay programmers could offer either more or a similar amount of programming than cable firms that do face competition.

Cable television firms will add an additional program if the marginal program revenues exceed the marginal programming costs. Marginal revenues can be received from three sources: new cable subscribers, existing cable subscribers who purchase more (or fewer cable services), and new subscribers switching from STV, or other competing technologies, to cable television.[19] Cable firms not currently facing competition from another source of pay television would only view marginal revenues coming from the first two sources. As a result of these differences in perceived marginal revenues across different markets, both the number of and diversity in programs would be greater in the monopolistically competitive market than in the isolated monopoly market. Indeed, it is these differences in perceived marginal revenues that has led some observers to note that monopolistically competitive industries will offer more product variety than isolated monopolists.[20]

Cable firms that deter entry through program selection decisions could offer more programming than other cable firms. Under these assumptions, cable firms could proliferate programming to preclude any product differentiation advantages of potential competitors.[21] These

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[19] Monopoly firms must also consider changes in revenue that could result if existing subscribers drop other services the firm offers.

[20] Spence (1976).

[21] The argument presented here is very similar to the one presented by Schmalensee and Scherer in their discussion of the ready-to-eat breakfast cereal case. There, it was suggested that existing cereal companies had deterred entry by proliferating cereal brands, which reduced the profitability of entry. See, for example, Schmalensee (1979) and Scherer (1979). For a general discussion of the role of product selection as an entry deterrent strategy, see Eaton and Lipsey (1979), and Wildman (1980).

entry deterring strategies are given added credibility if the cable operator maintains excess channel capacity. Even if entry by a competitor were successful, the cable operator maintains post entry flexibility to duplicate the program selection of other media competitors who generally have smaller channel capacities.

Finally, there are strong reasons to presume that the order of entry into a particular media market will also affect penetration. That is, cable penetration would be lower, *ceteris paribus*, when STV firms entered a media market before cable television. Lower penetration by cable firms in these situations could be due to product differentiation advantages of STV as the "pioneering" firm in a media market.[22] This advantage that incumbent STV firms have results from the relative uncertainty regarding the product (programming) quality of cable television firms.[23] Due to these asymmetries in product information, one would expect to see slower growth in cable penetration in areas where STV had originally entered.

EXPLAINING VARIATIONS IN PRICE-COST MARGINS

A number of variables will be used to explain both the variation in price-cost margins and program selection decisions of cable television firms facing different competitive situations. These variables will measure factors affecting both demand and supply conditions in each cable market. The unit of observation will be the market area where cable television is available. I have matched, as best as possible, penetration by competing technologies in each area where cable service is available.

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[22] Schmalensee (1982).

[23] In addition to the advantages associated with being the pioneering firm, STV firms have traditionally had an advertising advantage over most cable operators. The relevant market for an STV operator is the market area with good television reception. In contrast, the relevant market for cable operators is their franchise area. Most major cities have been divided into multiple franchise areas with one cable firm per franchise. Hence, the relevant market of STV firms--which covers the entire metropolitan area--is much larger than any one cable franchise. As a result, STV firms have made greater use of television advertising. This trend has been reversed, however, due to the recent growth in chains owning adjacent cable systems. This movement toward clustering has allowed chains to further exploit economies of scale.

The demand for cable television services results from a two-part process: first, there is the initial decision to purchase cable, followed by the decision of how many cable services to purchase. Factors affecting this decision process include:[24]

1. *Characteristics of the Basic and Expanded Basic service package.* Cable operators offer a number of services on the so-called basic service package over and above what is available from over-the-air television. These programs--which are delivered either by satellite or microwave service--include all-sports stations (ESPN), children's programming (Nickelodeon), all-news programs (CNN), and a variety of other specialty programs (e.g., Weather Channel, Silent Network, Black Entertainment Network, Music Television). Other factors held constant, one would expect that a larger number of programs offered on basic would increase cable penetration.

Another very important competitor to cable is over-the-air television. Certainly, as a number of past studies have revealed, the demand for basic cable service is very sensitive to the number and type of over-the-air broadcasts available on cable compared to those available over-the-air without cable. Indeed, more network, independent and educational stations available on cable compared to that offered over the air has a strong impact on cable penetration.[25]

2. *Signal Quality.* The ability to receive clearly over-the-air signals is historically one of the more important determinants of the penetration of cable television. The existence of poor signal reception was an important factor spurring the early development of the cable industry. Although the role of the cable operator has changed over time, signal quality remains an important determinant of cable penetration.

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[24] Some of the factors--such as programming decisions, and perhaps STV penetration--may be endogenous. To see how these econometric problems were handled, see footnote 29.

[25] Comanor and Mitchell (1966), Park (1971), Noll, Peck and McGowan (1973), Charles River Associates (1978), Bloch and Wirth (1982) and Park (1971).

3. *Income.* Past studies have revealed that cable television is a normal good. Hence, *ceteris paribus*, cable penetration appears to increase with income.

4. *Rate Regulation.* If rate regulation resulted in lower prices for basic cable service, one would expect to see lower basic price-cost margins. Overall, however, price-cost margins may not be reduced. Indeed, whether rate regulation of only the basic cable price lowers the firm's overall price-cost margin depends on how the cable operator, as a multiproduct firm, responds to the imposition of the regulatory constraint. Lower basic prices may, for example, simply result in higher pay cable prices, or the development of expanded basic service offerings which are not subject to rate regulation. Indeed, given the flexibility of cable firms to change prices for services that are not regulated, one would expect to see a reduced impact on the price-cost margins of cable operators. This study allows for such a test.

5. *Number of Pay Services Offered by the Cable System.* An increase in the number of pay television services offered by the cable system will increase the *total* price-cost margin.[26] Hence, one needs to control for this. Unfortunately, as the previous discussion illustrates, the service offerings by cable operators may not be exogenous in this model. To correct for this, two-stage least squares regressions will be run to determine the impact of endogeneity on this variable as well as other variables of interest.

6. *Ownership Characteristics.* There are strong incentives for vertical integration in the cable television industry. Vertically integrated firms may increase profits if they internally transfer inputs (i.e., programming) at the competitive marginal cost. Given the public good element of such programming, the social marginal cost is zero. In addition, the marginal programming costs paid by cable firms depend crucially on the total number of subscribers served. In general, group-owned cable systems serve more subscribers than independently owned

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[26] Remember that the dependent variable of interest is the weighted sum of all price-cost margins. The addition of another pay program will create another price-cost margin which is added to the summary measure. Hence, more programs offered by a cable system will increase the total summed price-cost measure.

systems. Thus, the marginal programming costs for all cable firms within a group are lower, *ceteris paribus*, than they would be if independently owned. On the other hand, however, if marginal costs fall one would expect that the product price would also decrease. Hence, the net effect on the price-cost margin depends on the relative magnitude of these two effects.[27]

7. *System Age*. Observed price-cost margins will also depend on the age of the cable system The inclusion of an age variable recognizes that both penetration and prices depend on the rate that cable systems mature. Linear splines will be employed to allow for flexibility in the functional form.

DATA

Ideally, any study attempting to document the competitive impact of the new video technologies on cable television needs very refined data. In particular, one would need to know the performance of these technologies in areas that presently have cable television available. As part of this study I have compiled a unique dataset. A number of STV operators throughout the country agreed to provide, on a confidential basis, the location of their subscribers by zip code. This information is unique in two respects. First, it will allow a direct comparison of the penetration of a major competitor to cable, STV, in cabled areas. Second, it provides an opportunity to detect empirically the economic impact of this competition on the cable industry.

In addition to the unique information regarding the location of STV subscribers, a telephone survey of 175 cable firms was used to gather more detailed information on actual pricing patterns in the cable industry.[28] I undertook the survey because there was no systematic

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[27] Again, it is very important to control for any supply side factors--such as vertical integration and group ownership--which may affect the magnitude of price-cost margins. I do not want to attribute increased market power to firms that receive programs at lower cost. Instead, I am primarily interested in examining variation in market power resulting from demand side factors.

[28] Cable systems used in the analysis were drawn from Kagan's publication, *Pay Cable TV by Households, 1983*. In this publication, relatively detailed information regarding the number of households receiving multiple pay programming was provided. Kagan reports this information from 392 of 2562 systems in their annual survey. Of the 392

published information available documenting either the actual pricing patterns of cable firms (e.g., bundling practices) or how programming has been packaged. Both pieces of information are crucial in determining the competitive impact of new technologies on the cable industry.

THE SAMPLE

On average, the sample used for the study represented slightly larger cable systems than the national average (see Table 5.2 and Appendix A). The difference, although not very large, reflected in part an attempt to match the sample. Since most cable firms facing competition from STV are larger systems, located in major metropolitan areas, an attempt was made to pick urban and suburban systems that do not face STV competition for comparison.

The estimation of the impact of competition on the price-cost margins of cable operators requires some assumptions about the functional form of the model. Specifically, the general expression of the model(s) estimated appear below. The definition of the variables, including their source, are displayed in Table 5.3a.

Table 5.2

COMPARISON OF 175 FIRM SAMPLE TO NATIONAL AVERAGES, 1983

Variable	Sample Average	National Average
Basic Subscribers	10250	8243
Homes Passed	17675	15779
Price Basic	8.56	8.45

Source: Sample and Kagan Census of Pay TV, 1983.

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firms reported in Kagan's 1983 publication, I randomly selected 175 firms for analysis. All 175 firms provided the requisite information on pricing and bundling decisions.

Table 5.3

GENERAL EXPRESSION OF THE MODEL(S) ESTIMATED

$$\begin{aligned}\ln (PCM) = {} & \alpha_0 + \alpha_1 (COMNET) + \alpha_2 (COMIND) + \alpha_3 (COMED) \\ & + \alpha_4 (TOP100) + \alpha_5 (TOP200) + \alpha_6 (OUTSIDE) \\ & + \alpha_7 (LYR) + \alpha_8 (SPLINE\ 1) + \alpha_9 (SPLINE\ 2) \\ & + \alpha_{10} (PION) + \alpha_{11} (PION\ 1) + \alpha_{12} (PION\ 2) \\ & + \alpha_{13} (SIG) + \alpha_{14} (LARGE) + \alpha_{15} (INDEP) \\ & + \alpha_{16} (MID) + \alpha_{17} (VI) + \alpha_{18} (INIT) \\ & + \alpha_{19} (LSERV) + \alpha_{20} (LAHI) + \alpha_{21} (REG) \\ & + \alpha_{22} (LSTV) + \alpha_{23} (SAT) + \alpha_{24} (X\ SAT) \\ & + \alpha_{25} (C1) + \alpha_{26} (C2) + \alpha_{27} (C3) + \alpha_{28} (C4) \\ & + \alpha_{29} (LPOP) + \alpha_{30} (LCAP)\end{aligned}$$

Table 5.3a

VARIABLE DEFINITIONS

NAME	DEFINITION	DATA SOURCE
LPCM	log of the cable firms price-cost margin + 1 where each service offered was weighted by its share of total revenue.	Kagan Census of Pay TV, 1983 Phone survey to determine how program services were bundled together and priced.
LSTV	log of the number of STV subscribers in a cable area + 1	Data received directly from STV operators throughout the United States
SAT	log of number of satellite services available on the basic service package + 1	Television/Cable Factbook, 1983
XSAT	log of number of satellite services on the expanded basic service package + 1	Same as SAT
COMNET	log (number of network services on cable/number of network stations in the Grade B contour area)*	Television/Cable Factbook, 1983
COMIND	log (number of independent stations on cable/number of educational stations within the Grade B contour on the cabled area.	Same as COMNET
COMED	log (number of educational stations on cable/number of educational stations within the Grade B contour of cable area).	Same as COMNET

*Grade B contour area is a technical measure indicating the quality of television reception. See Television/Cable Factbook, 1983 for definition.

NAME	DEFINITION	DATA SOURCE
LSERVE	log of the number of pay television services not available on basic or expanded basic service	Kagan, Census of Pay TV, 1983
LAHI	log of average household income in county where cable was available	Circulation, 1983
TOP100	dummy variable for existence of cable system in TV market between 1 and 100	Television/Cable Factbook, 1983
TOP200	dummy variable for existence of cable system in TV market between 101 and 200	Same as TOP100
OUTSIDE	dummy variable for existence of cable system outside all TV markets	Same as TOP100
SIG	variable ranging from 1 to 5 to denote physical obstructions of television signals. SIG takes on a value of 1 for the 3 worst obstruction codes and is 0 otherwise	Department of Interior, National Atlas, Geologic Survey

NAME	DEFINITION	DATA SOURCE
C1	dummy variable for cable system in the South	U.S. Census
C2	dummy variable for cable system in the North Central	U.S. Census
C3	dummy variable for cable system in the West	U.S. Census
C4	dummy variable for cable system in the Plains	U.S. Census
C5	dummy variable for cable system in the East	U.S. Census
INIT	dummy variable equal to 1 if STV operator entered market before cable firm	Kagan, Census of Pay TV, 1983
VI	dummy variable equal to 1 if cable firm was commonly owned with a major pay television programmer. These included:	Television/Cable Factbook, 1983

PAY PROGRAMMER	MSO
Home Box Office, Cinemax	ATC
Movie Channel	Warner Amex
Showtime	Viacom

LAGE	log of the age of the cable system (in years)	Kagan, Census of Pay TV, 1983
PION	is an interaction term between LAGE and INIT	

NAME	DEFINITION	DATA SOURCE
SPLINE1	allows for a separate coefficient to be estimated for cable systems that are less than or equal to three years old. That is, is min(0, log(YR)-log(3)).	
SPLINE2	allows for a separate coefficient to be estimated for cable systems greater than or equal to 10 years old. Hence it is defined as max(0, log(YR)-log(10))	
PION1	is an interaction term between SPLINE1 and INIT	
PION2	is an interaction term between SPLINE2 and INIT	
LARGE	identifies cable firms owned by one of the top 20 cable multiple system operators	Kagan, Census of Pay TV, 1983
MID	identifies cable firms owned by the next 30 largest multiple system operators	Same as LARGE
SMALL	identifies all remaining cable firms owned by multiple systems operators	Same as LARGE
LCAP	log of total hannel capacity of the cable system	Kagan, Census of Pay TV, 1983
LPOP	log of population in cable franchise area	Same as LCAP
LPROGS	log of total number of channels offering cable programming	Same as LCAP

EMPIRICAL RESULTS

A number of different models were evaluated to assess the effect existing modes of video competition--primarily over-the-air television and STV--had on the price-cost margins of cable firms. The results across these models were remarkably consistent.[29]

A number of interesting results emerged from the study (see Table 5.4). Perhaps the most notable was the impact STV had on the ability of cable firms to raise prices above costs. This impact differed appreciably depending on which technology was available first. In cable franchise areas where cable preceded STV, STV had a negative, although *very minor* impact on cable price-cost margins. In these markets, a one

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[29] Two generic models were used to detect the sensitivity of the results to model specification. First, there was some concern that the programming variables were endogenous. Therefore, in addition to the models reported in Table 5.4, a series of two-stage least squares regressions were completed. In general, the results of these regressions were very similar, and are reported in Appendix B. Further, there was also the possibility that STV penetration was also endogenous. Thus, another two-stage least squares regression was completed to check the extent of simultaneity bias resulting from STV penetration. Again, these results--which are described in Appendix B--were very similar to those reported in Table 5.4. Another method to check simultaneity problems resulting from the programming variables was to stratify the sample by the number of pay programs offered. Thus, the results in Appendix B are only for cable systems offering two pay television tiers. Again, the results of this model were quite consistent with those illustrated in Table 5.4. Discussion of the instruments used in each case are also found in the Appendixes.

The second set of models completed tested for any specification biases that might occur. In short, these models were devised to determine the influence that underlying cost conditions had on observed price-cost margins. To test for this influence, the sample was stratified by market and group size. Once again, the results of these models--which are shown in Appendix B--were quite consistent with the results reported in Table 5.4. Hence, given the consistency of these results across a wide variety of specifications, the models reported in Table 5.4 appear reasonably robust.

Finally, to test for the possible effect that individual observations could have on the coefficient estimates, statistics suggested by Cook (1977) and Belsley, Kuh and Welsch (1980) were calculated. In general, the Cook test allows one to detect the change in each parameter estimate by deleting the observation. Of the 175 observations, four were found to have an especially influential impact on the estimated coefficients. Although the deletion of these observations did change some coefficient estimates, resulting policy conclusions were not affected.

percent increase in STV penetration was associated with approximately a .004 to .007 percent decrease in the price-cost margin.

The competitive impact of STV on cable operators was more pronounced, however, when STV was the first video technology available. In these video markets, the price-cost margins of cable operators were, on average, an additional 9 percent lower.[30] Price-cost margins of older cable systems (ie., 10 years and up) were especially affected by entrenched STV firms. In these situations, price-cost margins of cable firms were 20 percent lower than cable firms that did not face an entrenched STV firm. In these markets, STV firms generally faced competition from relatively "small" cable systems (i.e., smaller channel capacities). Further, the impact of STV on cable decreases sharply over time--even when it is the pioneering video source. For example, price-cost margins of cable firms less than ten years old, facing competition from an entrenched STV firm, had price-cost margins less than 10 percent lower than other firms. Hence, STV appears to have a significant impact on the price-cost margins of cable operators, but this impact occurs only when it is the "pioneering" firm and appears to decline over time.

Price-cost margins of cable television firms outside the top 50 television markets were approximately 2 to 3 percent larger. This result seems plausible for a number of reasons. Most importantly, these variables were included to capture a number of potential competitors to cable and television viewing in general, such as other sources of entertainment, that are not easily measured. Cable firms outside the top media markets have fewer sources of competition for cable viewing, and therefore appear to have more market power.

Price-cost margins increase with the age of the cable system. This result is consistent with past studies examining the demand for cable television where final system penetration was time dependent.[31] To allow for flexibility in estimating the functional form of the age variable, a series of linear splines were employed. When a log relationship between system age and price-cost margin is assumed, the price-cost margins of cable operators increased approximately 3 percent

[30] This effect, of course, includes all relevant interaction terms.
[31] Comanor and Mitchell (1966).

FACTORS AFFECTING PRICE-COST MARGINS OF CABLE OPERATORS: ORDINARY LEAST SQUARES ESTIMATES AND STANDARD ERRORS

MODEL	CONSTANT	COMNET	COMIND	COMED	TOP100	TOP200	OUTSIDE	LYR	SPLINE1	SPLINE2	PION	PION1	PION2	SIG	LCAP	LPOP
1	.833*	-.0007	.0004	.011	.016	.0009	.013	.028*	-----	-----	.075*	-----	-----	.008	-----	-----
	(.280)	(.009)	(.008)	(.011)	(.013)	(.012)	(.013)	(.008)	-----	-----	(.017)	-----	-----	(.011)	-----	-----
2	.809*	-----	-----	-----	.021**	.007	.001	.052*	.038	-.049*	.044*	-----	-----	-----	-----	-----
	(.246)	-----	-----	-----	(.012)	(.011)	(.011)	(.014)	(.033)	(.023)	(.019)	-----	-----	-----	-----	-----
3	.871*	-----	-----	-----	.025	.011	.019*	.038*	.079	-.031	.128*	-.097	-.203	-----	-----	-----
	(.244)	-----	-----	-----	(.012)	(.011)	(.011)	(.017)	(.065)	(.025)	(.042)	(.081)	(.087)	-----	-----	-----
4	.928*	.005	-.001	.011	.013	.004	.019	.028**	.051	-.037	.049*	-----	-----	-----	-.017	.009*
	(.264)	(.009)	(.008)	(.011)	(.013)	(.012)	.013	(.015)	(.033)	(.023)	(.019)	-----	-----	-----	(.011)	(.004)

MODEL	LARGE	INDEP	MID	VI	INIT	LSERV	LAHI	REG	LSTV	SAT	X SAT	C1	C2	C3	C4	R-SQUARE
1	.030*	.009	.013	.006	-.169*	.005	-.109*	.009	-.004*	-.005	.001	.007	.005	.024	-.021	.70
	(.009)	(.014)	(.012)	(.013)	(.034)	(.015)	(.027)	(.012)	(.002)	(.006)	(.005)	(.015)	(.015)	(.015)	(.019	---
2	.033*	.017	.016	----	-.102*	----	-.111*	----	-.004*	----	----	----	----	.020*	----	.69
	(.008)	(.013)	(.011)	----	(.039)	----	(.023)	----	(.002)	----	----	----	----	(.010)	----	---
3	.033*	.011	.014	----	-.240*	----	-.116*	.023*	-.004*	----	----	----	----	.025*	----	.71
	(.008)	(.013)	(.011)	----	(.075)	----	(.023)	(.011)	(.002)	----	----	----	----	(.011)	----	---
4	.035*	.018	.014	.008	-.114*	----	-.122*	.016	-.005*	-.005	.003	.005	.007	.017	-.02	.73
	(.009)	(.013)	(.011)	(.013)	(.038)	----	(.026)	(.010)	(.002)	(.006)	(.005)	(.013)	(.013)	(.014)	(.02)	---

*Significantly different from zero, P ≤ .05 (two-tailed test)
**Significantly different from zero, P ≤ .10 (two-tailed test)

each year. Subsequent models using the linear splines, however, indicate that this relationship is not linear. Using this more flexible functional form, the relevant elasticities range from .05 to .08 over the first ten years of operation. Hence, cable systems appear to mature within the ten year time period. Beyond this time, price-cost margins appeared lower. Of course, this relationship could again be partially explained by the negative correlation between system age, channel capacity and number of program offerings (see Table 5.5).

The price-cost margins of cable systems facing rate regulations either by state or local governments did not differ appreciably from other systems. In fact, in one specification, rate regulation appeared positively related. As previously noted, the fact that rate regulation did not have a discernible negative effect on price-cost margins may not be surprising given the pricing flexibility which remains on expanded basic and pay television tiers. Further, rate regulation in the cable industry is more *ad hoc* than other industries. Indeed, there is rarely any formal rate of return decision; instead local regulators appear to use external references such as the rate of inflation to guide their decisions.[32] Other competition related variables--such as the

Table 5.5

CORRELATION COEFFICIENTS BETWEEN CABLE SYSTEM AGE, CHANNEL CAPACITY AND TOTAL PROGRAMS OFFERED

	LYR	LCAP	LSERV
LYR	1	--	--
LCAP	-.60*	1	--
LSERV	-.30*	.40*	1

*Significantly different from zero $P \leq .001$)

comparative service offerings of over-the-air television and signal quality--did not add to the explanatory power of the model.

One final demand side factor that was examined, average household income, produced the only seemingly anomalous result. The results imply that the price-cost margins of cable operators were negatively associated with higher income levels. This result runs counter to the expectation that higher income would, through demand side effects, lead to higher price-cost margins. There are two possible explanations for this result. First, it may be driven by supply and not demand side factors. In particular, the negative relationship between income and price-cost margins could be an artifact of the correlation between large cable groups--who have relatively lower programming costs--and television market size (see Table 5.6). Due to the programming cost advantage these groups enjoy, price-cost margins would be larger due to both demand, since there is less video competition, and supply side factors resulting from lower programming costs. Hence, the observed relationship may be driven by supply rather than any perverse demand side responses.

Table 5.6

CROSS-TABULATION OF MARKET SIZE BY GROUP OWNERSHIP
MSO SIZE

		LARGE	MID	SMALL	INDEPENDENT
MARKET SIZE	TOP 50	23	12	14	5
	TOP 100	8	0	12	2
	TOP 200	22	5	13	0
	OUTSIDE	27	8	10	8

[32] Kalba (1980).

Second, the observed negative relationship between income and the cable price-cost margin may be spurious. There is a strong positive association between STV penetration and household income. (See Table 5.7.) STV penetration is greater in relatively high income areas, yet greater STV penetration is also associated with lower cable price-cost margins. Thus, given the existing modeling techniques employed, it is quite possible that the observed negative relationship between income and cable price-cost margins is spurious.

SUPPLY SIDE RESULTS

Price-cost margins of cable systems owned by the top 20 multiple system operators were 3 percent higher than other cable firms.[33] Other ownership characteristics explained little of the cross-sectional variation in price-cost margins.

IMPACT OF COMPETITION ON PROGRAM SELECTION

Two different models were used to explain factors affecting the programming decisions of cable firms: the total number of cable channels programmed, and the number of pay television services offered. A number of factors affected the total number of cable programs offered (see Tables 5.8 and 5.8a). Demand side influences included the population of the cable franchise area. The estimated elasticity of the number of programs offered with respect to population was .09. Hence, a ten percent increase in population was associated with nearly a one percent increase in the number of channels programmed. Not surprisingly, the channel capacity of the system also affected the number of channels programmed. The estimates suggest that a 10 percent

[33] In order to test for the sensitivity of the results to the maintained hypothesis that vertically integrated firms internally transfer programming at its true social marginal cost, another series of regressions were run using positive marginal costs for these firms. That is, we assumed that the marginal programming costs paid by vertically integrated firms were calculated in exactly the same manner as non-integrated firms. This assumption did little to change the underlying relationships of interest. Further, this result was not particularly sensitive to the definition of "large" group. In particular, redefining the variable to include only the largest ten cable systems provided similar results.

Table 5.7

FACTORS AFFECTING STV PENETRATION:
ORDINARY LEAST SQUARES ESTIMATES AND STANDARD ERRORS

Variable	Estimated Coefficient	Standard Deviation	R-SQUARE = .51
CONSTANT*	-33.77	11.65	
COMNET	.37	.42	
COMIND	-.49	.35	
COMED**	-.83	.47	
LYR	.22	.71	
INIT	2.59	1.71	
LARGE	-.02	.41	
MID	-.18	.52	
INDEP	.43	.62	
XSAT	-.11	.23	
LSERV	.09	.68	
VI	.27	.58	
LAHI*	3.15	1.14	
REG	-.33	.52	
SAT	-.43	.28	
PION	-.59	.86	
LPOP	.43	.17	
LCAP	-.16	.51	
C1*	1.39	.63	
C2*	1.31	.66	
C3	.53	.65	
C4	1.11	.82	
SIG	.07	.47	
SPLINE 1	.45	1.44	
SPLINE 2	-1.13	1.05	
TOP 100	-.81	.57	
TOP 200**	-1.04	.54	
OUTSIDE	-.86	.59	

* Significantly different from zero, $p \leq .05$ (two-tailed test)
** Significantly different from zero, $p \leq .10$ (two-tailed test)

Table 5.8

LOG NUMBER OF CABLE CHANNELS PROGRAMMED:
ESTIMATED COEFFICIENTS AND STANDARD ERRORS

DEP VAR: LPROGS

VARIABLE	ESTIMATED COEFFICIENT	STANDARD ERROR	R-SQUARE = .31
INTERCEPT	12.19	2.47	
LCAP*	0.28	0.11	
LPOP*	0.09	0.03	
LSTV	-0.0055	0.01	
TOP100	-0.31	0.12	
TOP200	-0.20	0.12	
OUTSIDE	-0.25	0.12	
INIT	-0.04	0.15	
LYR*	-0.42	0.15	
SP1	0.11	0.30	
SP2**	0.44	0.23	
VI	0.08	0.13	
LARGE	0.06	0.09	
MID	0.12	0.11	
INDEP	-0.02	0.14	
SIG	-0.006	0.08	
REG	-0.12	0.11	
LAHI*	-1.10	0.24	

*Statistically different from zero, $P \leq .05$ (two-tailed test)
**Statistically different from zero, $P \leq .10$ (two-tailed test)

Table 5.8a

LOG NUMBER OF PAY TELEVISION PROGRAMS OFFERED:
ESTIMATED COEFFICIENTS AND STANDARD ERRORS

DEP VAR: LSERV

VARIABLE	ESTIMATED COEFFICIENT	STANDARD ERROR	R-SQUARE = .22
INTERCEPT	1.67	1.33	
LCAP**	0.10	0.06	
LPOP	0.02	0.02	
LSTV	.00002	0.01	
TOP100	-0.08	0.06	
TOP200	-0.08	0.06	
OUTSIDE	-0.08	0.06	
INIT	0.004	0.08	
LYR*	-0.20	0.08	
SP1	0.11	0.16	
SP2**	0.30	0.12	
VI	-0.08	0.07	
LARGE	0.02	0.05	
MID	-0.008	0.06	
INDEP	-0.08	0.07	
SIG	-0.02	0.04	
REG	0.06	0.06	
LAHI	-0.11	0.13	

*Statistically different from zero, $P \leq .05$ (two-tailed test)
**Statistically different from zero, $P \leq .10$ (two-tailed test)

increase in the number of channels offered is associated with approximately a three-percent increase in the number of cable programs. Competition from STV firms did not appear to influence the number of cable programs offered. This result was consistent across both models. Hence, at least in this particular sample, cable firms did not respond to competition by proliferating more programming. This is not to say, of course, that cable operators do not attempt to duplicate the program offerings of STV operators. Instead, there appears no substantial evidence that cable operators have attempted to deter entry through program proliferation.

The age of the cable system was also associated with the number of programs offered. Once again, the relationship between system age and the number of programs was nonlinear. In particular, newer cable systems tended to offer more cable programming. The relationship between system age and the number of programs offered was negative up to a threshold of ten years. Beyond ten years, there was no apparent relationship between system age and the number of cable programs.

The particular television market where the cable firm was located influenced the number of programs offered. Cable systems located outside the top 100 television markets offered anywhere from 25 to 30 percent fewer programs. This result may or may not have resulted from competition between cable operators and over the air television. Alternatively, the result could simply be an artifact of the larger channel capacity of cable systems in larger metropolitan markets that have resulted from local franchising proceedings. Based on the information presented, we cannot separate these competing explanations.

The average household income in the county where the cable franchise is located appears negatively related to the number of programs offered. Again, this result runs counter to the maintained hypothesis that higher income should, through demand side effects, lead to more cable programs.[34] Finally, there is no evidence from the data

[34] One of the problems with this line of analysis is that the initial size of the cable system is determined by the local cable regulatory body. There has been a clear trend over time for new cable systems to have much larger channel capacity, and program offerings than older systems. This trend is due to two factors: first, technological

supporting the proposition that vertically integrated firms discriminate against other programmers and therefore provide fewer services.

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change in the industry has lowered the cost of multi-channel cable systems, and second, the latest cities to receive cable have been large metropolitan areas--primarily center cities--where incomes are lower relative to suburban areas, and channel capacities are often much larger. For a quick analysis of these trends over time, see *Television and Cable Factbook, Cable and Services Volume*, 1983.

VI. CONCLUSIONS AND POLICY IMPLICATIONS

Much of the recent policy debate over the structure of regulation in the cable television industry has focused on the competitiveness of video media markets. One point of contention is that cable operators are natural monopolists with monopoly pricing powers which thwart federal policy goals promoting source and program diversity, access to the media and economic efficiency. As part of this on-going policy debate, both houses of Congress have recently passed legislation (S. 66 and HR. 4103) that would alter the current regulatory structure. Notable features of the legislation are the attempts to restrict the regulatory powers of state and local governments in the cable franchising process. Much of the rationale for the movement toward "deregulation" stems from the growth in competitive alternatives to cable television. Due to this influx of new technology, it is argued, most media markets are "workably" competitive thus warranting a more relaxed regulatory atmosphere. Policy prescriptions that follow have usually included loosened cross-ownership restrictions between cable systems and broadcasters, eliminating rate regulation, and access requirements.

Much of the policy discussion appears to lead to a simple dichotomy: if cable firms have market power then regulate; otherwise do not. This framework is too narrow, however, since it neglects the role of long term contracts as a form of regulation.[1]

Given the specialized technology employed by the cable industry, some form of regulation will always be required. Long term contracts are required to initially attract the specialized capital to build a cable television system. Due to the legal entry barriers created by local governments, as well as those resulting from the "sunk" cost nature of cable technology, cable firms are able to exercise monopoly powers.[2]

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[1] Goldberg (1976).

[2] Baumol, Panzar and Willig (1982).

Hence, the interesting policy question is not whether to regulate cable systems if they price above costs--surely they all do. Rather, the question is how to structure and administer long-term cable franchise agreements to further stated federal policy goals.

Within this broader regulatory context, there are a number of important decisions regulators must undertake. These decisions include trade-offs that are important to highlight. Potential bidders for the cable franchise base their bids on expectations concerning the expected profitability of the franchise. Larger expected profits increase the likelihood that potential bidders will install cable systems of higher "quality" (i.e., larger channel capacity, two-way interactive systems, and more channels programmed). Of course, the converse is also true. Local regulators have substantial influence over a number of factors influencing the profitability of a cable system. This power stems from the regulators influence over the regulation of competitors to cable, contract length, renewal expectations, franchise fees, and rate regulation. More profitable cable contracts, in part influenced by the terms of the contract, may produce greater cable "quality" but may also entail costs such as short-run monopoly pricing, and inhibiting consumers from adopting newer, potentially cheaper substitutes to cable. Hence, the "appropriate" trade-offs between prices and quality are difficult, *a priori*, to prescribe.

Within the broader context of long-term cable franchise agreements, a number of "short-run" allocation decisions are required. Cable regulators must administer the contract by choosing among numerous mechanisms to allow for short-run price and quality adjustments.[2] In particular, the empirical analysis in the chapter provides information for policymakers regarding the impact of rate regulation, and video competition on the short-run price and quality decisions of cable firms.

Past government policy regulating the basic cable price appears both theoretically flawed and ineffective in practice. As previously noted, past rate regulation, based on the assumption that cable is a private good, has mistakenly assumed there would be gains in social

[2] The analysis presented above provides useful information for these short-run allocation decisions.

welfare by moving prices closer to costs. Yet, cable television signals are public, not private goods. Thus, policy prescriptions enhancing social welfare in the public good case may differ from those prescribed in the private good case.

Moreover, existing rate regulation appears ineffective in practice. Given the current method of rate regulation, which covers only the basic cable rates, there was no discernible difference between cable price-cost margins, or the number of programs offered over cable in regulated or non-rate regulated systems. Hence, recent legislation proposing to restrict the ability of local regulators to use rate regulation as a short-run policy tool may not, on average, significantly affect consumers, cable operators, or federal policy goals.

In contrast, competition from other video media did have a competitive impact on cable operators. In areas where STV firms entered a market before cable was available, cable price-cost margins were nearly 10 percent lower than in other markets. Where STV entered after cable was available, however, there was a negligible impact on the price-cost margins of cable firms. Although the finding that competition from even a single channel competitor to cable may reduce overall price-cost margins is interesting, it may not be a useful guide for public policy. Many areas of the country already have cable available. Indeed, most of the growth in the industry has already been completed. Hence, new competitive technologies, such as multichannel MDS, and DBS will usually face competition from an entrenched cable operator. Although these technologies are multi-channel, they generally have fewer channels available than cable. Hence, unless the new technologies are able to enter cabled area through differentiating their program offerings from cable, the competitive role of these outlets may be limited.[4] Indeed, some DBS firms have already focused on areas of the country that will never have cable for their marketing efforts.

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[4] Again, it is important to note that there is not free entry for many competing technologies to cable, including multichannel MDS, STV, SMATV, and low power television. All of these alternative video programmers must obtain some type of prior regulatory approval before entering a market. This entry lag, however, may provide a cable operator with large, excess channel capacity to "react" to potential entry by adjusting his price and, or programming decisions.

The rapid growth in videocassette recorders, however, may have a greater impact on cable firms than other technologies. The extent of this impact is yet to be realized fully and should be monitored carefully. It is not clear, however, whether VCRs are substitutes or merely complementary to purchasing cable television.

Cable television firms in the top 50 television markets have lower price-cost margins than other cable firms. In fact, the analysis suggested that the price-cost margins in these markets were approximately 3 percent lower than elsewhere. This result seems reasonable given the large number of competing sources of entertainment to cable in the largest media markets.

Competition from either STV or over-the-air television did not appear to influence the number of programs offered by the cable operator. Indeed, it appears that these decisions are influenced primarily by local cable regulators through the initial franchise bidding process, the renewal process, as well as the population size of the cable franchise market.

Finally, whether the competitive impacts of STV observed in the study are "adequate" for the short run allocation goals of local regulators cannot be easily determined. One can say, however, that existing rate regulation of basic cable rates does not have a discernible negative impact on price-cost margins. Hence, existing rate regulation is not an effective short run allocation tool. If local cable regulators want to achieve short run resource allocation results similar to those cable firms in the top 50 markets, or those facing competition from an entrenched STV firm, other policy instruments need to be explored.

APPENDIXES

Appendix A

SAMPLE MEANS AND STANDARD DEVIATIONS IN:

	Cable Markets Without STV		Cable Markets With STV	
Variable	Mean	Standard Deviation	Mean	Standard Deviation
COMNET	.54	.56	.09	.22
COMIND	.62	.54	.13	.32
COMED	.36	.39	.06	.25
TOP 100	.14	.34	.12	.33
TOP 200	.30	.46	.10	.30
OUTSIDE	.42	.49	.07	.27
TOP 50	.15	.36	.71	.46
LARGE	.46	.50	.43	.50
INDEP	.08	.30	.10	.30
MID	.13	.33	.20	.40
SMALL	.31	.47	.24	.43
LYR	16.7	8.10	9.10	6.72
PION	0	0	.52	.82
SIG	.41	.49	.18	.39
VI	.10	.30	.06	.24
INIT	0	0	.34	.48
SERV	2.14	.47	2.43	.81
AHI	22688	3827	29304	4917
REG	.91	.39	.92	.39
SAT	1.22	.69	1.24	.88
XSAT	.43	.82	.54	.91
PCM	.86	.04	.79	.07
C1	.34	.48	.25	.44
C2	.27	.45	.51	.50
C3	.12	.32	.18	.39
C4	.12	.32	.02	.14
C5	.15	.36	.04	.20
CAP	22.36	10.15	33.36	13.75
POP	53742	269441	69889	103400
	N = 118		N = 51	

Appendix B

The general form of the models estimated in the text relate price-cost margins to a vector of exogenous variables as well as an output measure--the number of pay television programs. Since prices and outputs are determined simultaneously, it is probable that the number of pay television programs variable is endogenous. Use of ordinary least squares in this case will generate inconcsistent estimators of the coefficients. A number of different modelling approaches were employed to correct for any possible simultaneity biases in the price-cost equations, including two-stage least squares, reduced form estimates and stratifying the sample by the number of pay programs offered. These different estimating procedures and their results are presented below.

Two-Stage Least Squares

Estimation of two-stage least squares model requires one to replace the pay program variable on the right hand side of the price-cost equation with a constructed regressor serving as its proxy. Thus, at least one exogenous variable excluded from the price-cost margin regression yet correlated with the pay programming variable is required. Identifying good instruments to use in simultaneous equations models is usually difficult, however. In this case, structural models for both the price-cost margin and pay programming equations did not yield any obvious instruments. In light of this difficulty, the following procedure was used. First, the ordinary least squares regressions (Table 5.4 in the text) served to identify useful candidates. Candidate variables to be used as instruments were those not statistically related to the price-cost margin yet were associated with the pay programming variable. Variables fitting this description were COMNET, COMIND, COMED, LCAP, C1, C2, C4, and SIG. These instruments were used in the first stage regression to predict values of the pay programming variable. The predicted values were then used in the second stage regression.

Results of the two-stage least squares procedure are displayed in Table B.1. Note that the ordinary least squares estimates of the policy variables of interest (PION, LSTV, and REG) in Tables 5.4 do not differ

Table B.1

FACTORS AFFECTING PRICE-COST MARGINS OF CABLE OPERATORS:
TWO-STAGE LEAST SQUARES ESTIMATES AND STANDARD ERRORS

Variable	Estimated Coefficient	Standard Error
CONSTANT*	.807	.327
TOP 100	.022	.014
TOP 200	.007	.013
OUTSIDE	.017	.014
LYR*	.052	.017
PION*	.044	.019
SP1	.043	.033
SP2	-.052	.024
LPROGS***	.003	.018
LARGE*	.033	.009
INDEP	.014	.014
MID	.016	.011
VI	.005	.013
INIT*	-.102	.039
LAHI*	-.113	.029
REG*	.023	.011
LSTV*	-.005	.002
C3*	.020	.010

* Significantly different from zero, $p \leq .05$ (two-tailed test)
** Significantly different from zero, $p \leq .10$ (two-tailed test)
*** LPROGS is the endogenous variable.

appreciably from the two-stage least estimates. Thus, if any simultaneity bias exists, its impact on the estimated coefficients does not appear very important.

Another method to obtain estimates for the parameters in a simultaneous equation model is to estimate the reduced form. Reduced form estimates relate endogenous variables to all exogenous variables in the system. This requires specification of two structural models (one for which each of the endogenouos variables LPCM and LPROG) which ultimately relate price-cost margins to all the exogenous variables in both equations. Results of the reduced form estimates are displayed in Table B.2. Again, estimates for the policy variables of interest are quite similar to the other models reported. The estimated elasticity of

Table B.2

REDUCED-FORM ESTIMATES OF FACTORS AFFECTING PRICE-COST OF CABLE OPERATORS: ORDINARY LEAST SQUARES ESTIMATES AND STANDARD ERRORS

Variable	Estimated Coefficient	Standard Error	R-SQUARE = .73
CONSTANT*	.813	.261	
COMNET	.004	.009	
COMIND	-.002	.008	
COMED	.012	.011	
LYR*	.032	.016	
INIT*	-.115	.038	
LAHI*	-.113	.026	
REGG	.017	.012	
LSTV*	-.005	.002	
PION	.049	.019	
SP1	.052	.032	
SP2	-.036	.023	
LCAP	-.015	.011	
LPOP*	.009	.004	
C1	.002	.014	
C2**	.003	.014	
C3	.016	.014	
C4	-.024	.018	
SIG	.001	.010	
TOP100	.019	.012	
TOP200	.007	.012	
OUTSIDE	.019	.013	
LARGE*	.034	.008	
INDEP	.017	.013	
MID	.015	.011	

* Significantly different from zero, $p < .05$ (two-tailed test)
** Significantly different from zero, $p < .10$ (two-tailed test)

the cable price-cost margin with respect to STV penetration is -.005, which in nearly identical to estimates in both the ordinary least squares and two-stage least squares models.

Other policy variables of interest, such as rate regulation and the competitive impact of STV when it is the pioneering firm, are essentially the same.

A final method employed to reduce problems when estimating simultaneous equations was to stratify the sample by the number of pay programs offered. Once stratified, separate ordinary least squares regressions may be estimated. The results displayed in Table B.3 are only for those cable systems offering two pay programs. Since over two-thirds of the sample were included in this regression, there were not sufficient degrees of freedom to provide separate estimates for the remaining cable systems. Again, comparisons of these results with those displayed in Table 5.4 or other efforts to circumvent eimultaneity problems do not yield significant differences. In this model, a ten percent increase in STV penetration is associated with a .07 percent decrease in the cable price-cost margin. The estimated impact of STV on price-cost margins when it is the pioneering firm is slightly lower, however, than previous estimates. Comparisons of other results with those displayed in Tables 5.4 or B.1 and B.2 do not yield significant differences. Thus, the results appear reasonably robust.

There was also some concern that STV penetration was also endogenous. If so, the estimated coefficient on STV as well as those exogenous variables highly correlated may be biased. To test for this possibility, two-stage least squares regressions were estimated designating STV penetration as an endogenous variagble. (See Table B.4.) Instruments selected to estimate the model included COMED, COMIND, INIT, PION, LCAP, and C1. The selection criteria for these instruments was similar to that employed in the previous two-stage least squares equation. Coefficient estimates on the major variable of interest, LSTV, were slightly higher than in other equations. In this equation, a 10 percent increase in STV penetration was associated with a .13 percent decrease in the cable price-cost margin. Although slightly higher, the different estimate does not change any of the ultimate policy insights.

Two final models were estimated to test for any possible specification biases in the modelling process. Large price-cost margins, for example, may stem from demand side market power as well as differences in program acquisition costs. It would be misleading, however, to attribute greater market power to firms simplyy because they belong to large groups. Thus, as another method of focusing on demand

Table B.3

FACTORS AFFECTING PRICE-COST MARGINS OF CABLE OPERATORS OFFERING TWO PAY PROGRAMS: ORDINARY LEAST SQUARES ESTIMATES AND STANDARD ERRORS

Variable	Estimated Coefficient	Standard Error	R-SQUARE = .71
CONSTANT*	.650	.258	
COMNET	.006	.008	
COMIND	.005	.007	
COMED	.012	.010	
TOP 100	.006	.013	
TOP 200	-.003	.011	
OUTSIDE	.006	.012	
LYR*	.047	.019	
SPLINE 1	-.018	.063	
SPLINE 2*	-.054	.024	
PION **	.039	.024	
LARGE *	.050	.008	
INDEP	.006	.013	
MID*	.042	.011	
LCAP	-.013	.011	
LPOP	.004	.004	
VI	.009	.011	
INIT**	-.084	.048	
LAHI*	-.096	.025	
REG	.009	.009	
LSTV*	.007	.002	
SAT	-.010	.006	
XSAT	.0008	.005	
C1	.011	.012	
C2**	.021	.0123	
C3	.016	.013	
C4	-.007	.015	

* Significantly different from zero, $p \leq .05$ (two-tailed test)
** Significantly different from zero, $p \leq .10$ (two-tailed test)

Table B.4

FACTORS AFFECTING PRICE-COST MARGINS OF CABLE OPERATORS:
TWO-STAGE LEAST SQUARES ESTIMATES AND STANDARD ERRORS

Variable	Estimated Coefficient	Standard Deviation
CONSTANT	.80	.32
LSTV*a	-.013	.005
LYR*	.041	.016
LARGE*	.034	.009
MID**	.021	.011
INDEP	.023	.014
VI	.012	.013
LAHI*	-.113	.032
REG	.019	.011
SAT	-.008	.006
XSAT	.003	.005
LSERV	.012	.015
SP1*	.087	.031
SP2*	-.059	.024
TOP 100	.009	.014
TOP 200	-.003	.014
OUTSIDE	.013	.014

* Significantly different from zero, $p \leq .05$ (two-tailed test)
** Significantly different from zero, $p \leq .10$ (two-tailed test)
a LSTV is treated as an endogenous variable

Instruments used in the first stage regression included COMNET, COMIND, COMED, INIT, PION, LPOP, LCAP, and C1.

side market power, I have stratified the sample by group size. Estimates reported below (see Table B.5) are for those cable firms owned by large and mid sized cable groups. Of special interest are the estimated coefficients on STV penetration and rate regulation. The estimated relationships for these variables are similar to all previous results reported above. The estimated elasticity of the cable price-cost margins with respect to STV penetration is -.006 which is nearly identical to estimates in other equations. Like previouos estimates, the impact of STV on cable was more pronounced when it was the pioneering technology. In this particular model, when STV was available

Table B.5

FACTORS AFFECTING PRICE-COST MARGINS OF CABLE OPERATORS OWNED BY LARGE AND MID-SIZED GROUPS: ORDINARY LEAST SQUARES ESTIMATES AND STANDARD ERRORS

Variable	Estimated Coefficient	Standard Error	R-SQUARE = .83
CONSTANT*	.919	.311	
COMNET	.009	.012	
COMIND	-.003	.011	
COMED	-.021	.013	
LYR*	.072	.023	
INIT*	-.068	.034	
XSAT	.002	.005	
LSERV	-.017	.021	
VI	.015	.011	
REG	.010	.010	
SAT	-.011	.007	
PION	.030	.023	
LPOP*	.011	.005	
LCAP	-.004	.015	
C1	.019	.016	
C2	.020	.017	
C3	.026	.017	
C4	.031	.025	
SIG	-.002	.011	
SP1	.007	.038	
SP2*	-.063	.031	

* Significantly different from zero, $p \leq .05$ (two-tailed test)
** Significantly different from zero, $p \leq .10$ (two-tailed test)

before cable, price-cost margins were an additional 6.8 percent lower. This is consistent with earlier estimates. Rate regulation does not appear to be associated with either lower or higher price-cost margins.

Other sources of entertainment beside competing video sources will likely affect price-cost margins. Many of these competing sources of entertainment are not held constant in the model potentially creating an errors-in-variables problem. One method to determine the cumulative importance of these omitted variables is to examine price-cost margins in media markets offering similar types of non-video entertainment opportunities. To facilitate this comparison, the sample was stratified

by television market size. Regressions reported below (see Table B.6) display results regressing price-cost margins on the exogenous variables of interest. The estimated elasticity of the price-cost margin with respect to STV penetration is again very similar to previous results. Beyond this, the estimated impact of STV on cable price-cost margins when it is the pioneering technology are slightly higher, suggesting that it is associated with price-cost margins 24 percent lower. Estimates of this effect in the full models reported in Table 5.4,

Table B.6

FACTORS AFFECTING PRICE-COST MARGINS OF CABLE OPERATORS IN THE TOP 100 TELEVISION MARKETS: ORDINARY LEAST SQUARES ESTIMATES AND STANDARD ERRORS

Variable	Estimated Coefficient	Standard Error
CONSTANT	.393	.583
COMNET	.031	.025
COMIND	-.007	.018
COMED	.015	.022
LYR	.019	.028
INIT*	-.237	.078
LARGE	.005	.020
MID	-.036	.025
INDEP	-.001	.029
VI	.010	.027
LSERV	-.007	.027
LAHI	-.059	.058
REG	.0001	.028
LSTV*	-.006	.003
PION*	.124	.043
SP1	-.002	.049
SP2	-.016	.055
SAT	-.006	.010
XSAT	-.004	.009
C1	-.001	.029
C2	.042	.028
C3	.042	.027
C4	-.048	.047
SIG	.0009	.023

* Significantly different from zero, $p \leq .05$ (two-tailed test)
** Significantly different from zero, $p \leq .10$ (two-tailed test)

BIBLIOGRAPHY

Adams, W. and J. Yellen, "Commodity Bundling and the Burden of Monopoly," *Quarterly Journal of Economics*, No. 90, 1976.

Alchian, A., and W. Allen, *Exchange and Production: Competition, Coordination and Control*, Second Edition, Wadsworth Publishing, Belmont, California, 1977.

Applebaum E, "The Estimation of the Degree of Oligopoly Power," *Journal of Econometrics* 19, 1982.

Baer, W. S., H. Geller, J. Grundfest, *Newspaper-Television Station Cross-Ownership: Options for Federal Action*, R-1585-MF, The Rand Corporation, Santa Monica, September 1974.

Baer, W. S., H. Geller, J. Grundfest, K. Possner, *Concentration of Mass Media Ownership: Assessing the State of Current Knowledge*, R-1584-NSF, The Rand Corporation, Santa Monica, 1974.

Baumol, W., J. Panzar, R. Willig, *Contestable Markets and the Theory of Industry Structure*, Harcourt, Brace, Jovanovich, 1982.

Beebe, J, "Institutional Structure and Program Choice in Television Markets," *Quarterly Journal of Economics*, February 1977.

Besen, S.M., and L. Johnson, *An Economic Analysis of Mandatory Leased Channel Access for Cable Television*, R-2989-MF, The Rand Corporation, Santa Monica, December 1982.

Belsley, D.A., E. Kuh, R.E. Welsch, *Regression Diagnostics*. John Wiley and Sons, New York, 1980.

Bloch H., and M. Wirth *Demand for Pay TV and Its Impact on Expansion of Cable Availability*, Center for Mass Communications Research and Policy, University of Denver, June 1982.

Bothwell, J. T. Cooley, and T. Hall, "A New View of the Market Structure Performance Debate," *The Journal of Industrial Economics*, June 23, 1984.

Braunstein, Y., et al. *Economic Impact of State Cable TV Reglation*, Program on Information Resources Policy, Harvard University, July 1978.

Charles River Associates. "Analysis of Demand for Cable TV." *CRA Report No. 178-2*, Boston, 1978.

Comanor, W., and B. Mitchell. "CATV Systems and Local TV Station Audience," *Quarterly Journal of Economics* 80, 1966.

Cook, R.D., "Detection of Influential Observations in Linear Regression," *Technometrics* 19, 1977.

Cowling, K., and M. Waterson, "Price-Cost Margins and Market Structure," *Economica 43*, 1976.

Demsetz, H, "Why Regulate Utilities?," *Journal of Law and Economics* 11, October 1968.

-----, "Information and Efficiency: Another Viewpoint," 12, *Journal of Law and Economics*, April 1969.

-----, "Industry Structure, Market Rivalry, and Public Policy," *The Journal of Law and Economics*, 16 April 1973.

Dertouzos, J., and K. Thorpe, *Newspaper Groups: Economies of Scale, Tax Laws and Merger Incentives*, R-2878-SBA, The Rand Corporation, Santa Monica, June 1982.

Dickson, V.A, "Conjectural Variation Elasticities and Concentration," *Economics Letters* 7, 1981.

Eaton, C.B., and R.G. Lipsey, "The Theory of Market Pre-emption: The Persistence of Excess Capacity and Monopoly in Growing Spatial Markets," *Economica*, May 1979.

Federal Communications Commission, Network Inquiry Special Staff, *An Analysis of the Network-Affiliate Regulation in Television*, November 1980.

Fisher, F, "Diagnosing Monopoly," *Quarterly Review of Economics and Business*, Summer 1979.

Fisher, F., and J. McGowan, "On the Misuse of Accounting Rates to Infer Monopoly Profits," *American Economic Review*, March 1983.

Goldberg, V.P., "Regulation and Administered Contracts," *The Bell Journal of Economics*, Autumn 1976.

Gordon, K., J. Levy, and R. Preece, *FCC Policy on Cable Ownership*, Office of Plans and Policy, Federal Communications Commission, November 1981.

Harberger, A., "Monopoly and Resource Allocation," *American Economic Review* 44, May 1954.

Hotelling, H., "Stability in Competition," *The Economic Journal*, Vol. 29, March 1929.

Kagan, P., *Census of Pay Television*, Paul Kagan Associates, 1983.

Kalba, K., *Executive Summary on Findings of State Regulation*, Program on Information Resources Policy, Harvard University, 1980.

Keynes, J., *The General Theory of Employment, Interest and Money*, 1936.

Klein, B., R. Crawford, and A. Alchian., "Vertical Integration, Appropriable Rents and the Competitive Contracting Process," *The Journal of Law and Economics*, October 1978.

Krasnow, E., L. Longley, and H. Terry, *The Politics of Broadcast Regulation*, Third Edition, St. Martin's Press, New York, 1982.

Kwoka, J., "The Effect of Market Share Distribution on Industry Performance," *Review of Economics and Statistics* 61, February 1979.

Levy, J., and F. Setzer, *Concentration in Home Video Markets*, Office of Plans and Policy, Federal Communications Commission, 1982.

Lintner, J., "Security Prices, Risk, and Maximal Gain from Diversification," *Journal of Finance*, 20 December 1965.

McCloskey, D., *The Applied Theory of Price*, MacMillan, 1982.

National League of Cities, *Regulating Cable Television*, November 1981.

Needham, D., *The Economics of Industrial Structure, Conduct and Performance*, Holt, Rinehart and Winston, Eastborne, 1978.

Noam, E., *Economies of Scale in Cable Television*, Working Paper, Columbia University, August 1982.

Noll, R., M. Peck, and J. McGowan, *Economic Aspects of Television Regulation*, Brookings Institution, Washington, D.C.

Ordover, J.A., and R. Willig, "Notes on Non-Price Anticompetitive Practices by Dominant Firms," Telecommunications Policy Research Conference, Annapolis, Maryland, 1981.

Owen, B., "Public Policy and Emerging Technology in the Media," 18, *Public Policy*, 539 (1970).

-----, J. Beebe, and W. Manning, *Television Economics*, Heath, Lexington, D.C., 1974.

-----, *Economics and Freedom of Expression Media Structure and the First Amendment*, Ballinger, Cambridge, 1975.

-----, and P. Greenhalgh, *Competitive Policy Considerations in Cable Television Franchising*, Economists, Inc., Washington, D.C., October 1982.

Park, R.E., *Audience Diversion Due to Cable Television: A Statistical Analysis of New Data*, R-2403-FCC, The Rand Corporation, Santa Monica, April 1979.

Peltzman, S., "Toward a More General Theory of Regulation," *Journal of Law and Economics*, Vol. 23, 1980.

Phillips, O., "Product Bundles, Price Discrimination and a Two-Product Firm," Working Paper, Department of Economics, Texas A & M, 1980.

Pottle, J., and P. Bortz, *The Impact of Competitive Distribution Technologies on Cable Television*, Browne, Bortz and Coddington, March 1982.

Rogerson, W. P., "The Social Costs of Monopoly and Regulation: A Game Theoretic Analysis," *The Bell Journal of Economics*, Autumn 1982.

Rosse, J., "Estimating Cost Function Parameters Without Using Cost Data: Illustrated Methodology," *Econometrica*, March 1970.

Salinger, M., "Tobin's Q, Unionization, and the Concentration-Profits Relationship," *The Rand Journal of Economics*, No. 15, Summer 1984.

Scherer, F.M., *The Weapons Acquisition Process: Economic Incentives*, Harvard Business School, Boston, 1964.

-----, "The Welfare Economics of Product Variety: An Application to the RTE Cereals Industry," *Journal of Industrial Economics*, 1979.

-----, *Industrial Market Structure and Economic Performance*, Rand McNally, Chicago, 1980.

Schmalensee, R., "Entry Deterrence in the RTE Breakfast Cereal Industry," *Bell Journal of Economics*, Autumn, 1978.

-----, "Product Differentiation Advantages of Pioneering Brands," *American Economic Review*, June 1982.

Schwartz, A., and L. Wilde, "Imperfect Information, Monopolistic Competition and Public Policy," *American Economic Review*, papers and proceedings, May 1982.

Schwartz, M., and R. Reynolds, "Contestable Markets: An Uprising in the Theory of Industry Structure, Comment," *The American Economic Review*, June 1983.

Sharkey, W., *The Theory of Natural Monopoly*, Cambridge Press, Cambridge, 1982.

Sharpe, W., "Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk," *Journal of Finance*, 19 September 1964.

Shooshan, H., C. L. Jackson, and A. Kahn, *Cable Television: The Monopoly Myth and Competitive Reality*, National Cable Television Association, Washington, D.C., 1982.

Spence, M., "Product Selection, Fixed Costs and Monopolistic Competition," *Review of Economic Studies*, 43, June 1976.

Steiner, P.O., "Program Patterns and Preferences, and the Workability of Competition in Radio Broadcasting," *Quarterly Journal of Economics*, Vol. 66, May 1952.

Stern, J., E. Krasnow, and R. Senkowski, "The New Video Marketplace and the Search for a Coherent Regulatory Philosophy," *Catholic University Law Review*, 32, Spring 1983.

Stigler, G., "United States vs. Loews's, Inc.: A Note on Block Booking" in P. Kurland, *The Supreme Court Review: 1963*, University of Chicago Press, Chicago, 1963.

-----, "The Theory of Economic Regulation, *Bell Journal of Economics and Management Science*, Vol. 2, 1971.

Television Digest, *Television and Cable Factbook, Cable and Services Volume*, 1982-1983 edition.

Tullock, G., "The Welfare Costs of Tariffs, Monopolies, and Theft," 5, *Western Economic Journal* (1967).

U.S. House of Representatives, 97th Congress, Hearing Before the Committee on Energy and Commerce Regarding H.R. 4103.

U.S. Senate, 97th Congress, Hearings Before the Subcommittee on Communications of the Committee on Commerce, Science and Transportation, on *Cable Television Regulation*.

Vernon, J., and D. Graham, "Profitability of Monopolization by Vertical Integration," *Journal of Political Economy* 79, July/August 1971.

Wildman, S. "Vertical Integration in Broadcasting: A Study of Network Owned and Operated Stations," *Proceedings of the Symposium on Media Concentration*, Federal Trade Commission, Washington, D.C. ,1978.

-----, "A Spatial Model of Entry Deterrence," Working Paper, Department of Economics, UCLA, December 1980.

Williamson, O.E., "Franchise Bidding For Natural Monopolies--In General and With Respect to CATV," *Bell Journal of Economics*, Spring 1976.

Willig, R., "Pareto-Superior Nonlinear Outlay Schedules," *Bell Journal of Economics*, Spring 1978.